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EXCAVATING ENGINEER

FOUNDED 1905

Marines use a bullgrader, an active combat weapon as well as an important piece of construction equipment, to flush Jap snipers out of the debris near an air strip in "mopping up" operations on Namur Island in the Marshalls.
Official U. S. Marine Corps Photo

TOP PRODUCTION DEMANDS THE *Best*

Utter destruction of the enemy is "top production" in the battle zones. That's a job requiring the **best** in men and equipment — getting there first with the most is no longer enough.

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In mining, too, only with the best equipment can you hope to realize your production peak. With job-fitted, field-proved Bucyrus-Erie placer dredges, mining shovels, blast hole drills you know you have machines on which you can rely for top-speed, top-output performance under the toughest conditions. Behind every Bucyrus-Erie unit is more than 60 years of 'know how", of designing and building machines to do your work with greatest efficiency.

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ARMY E NAVY

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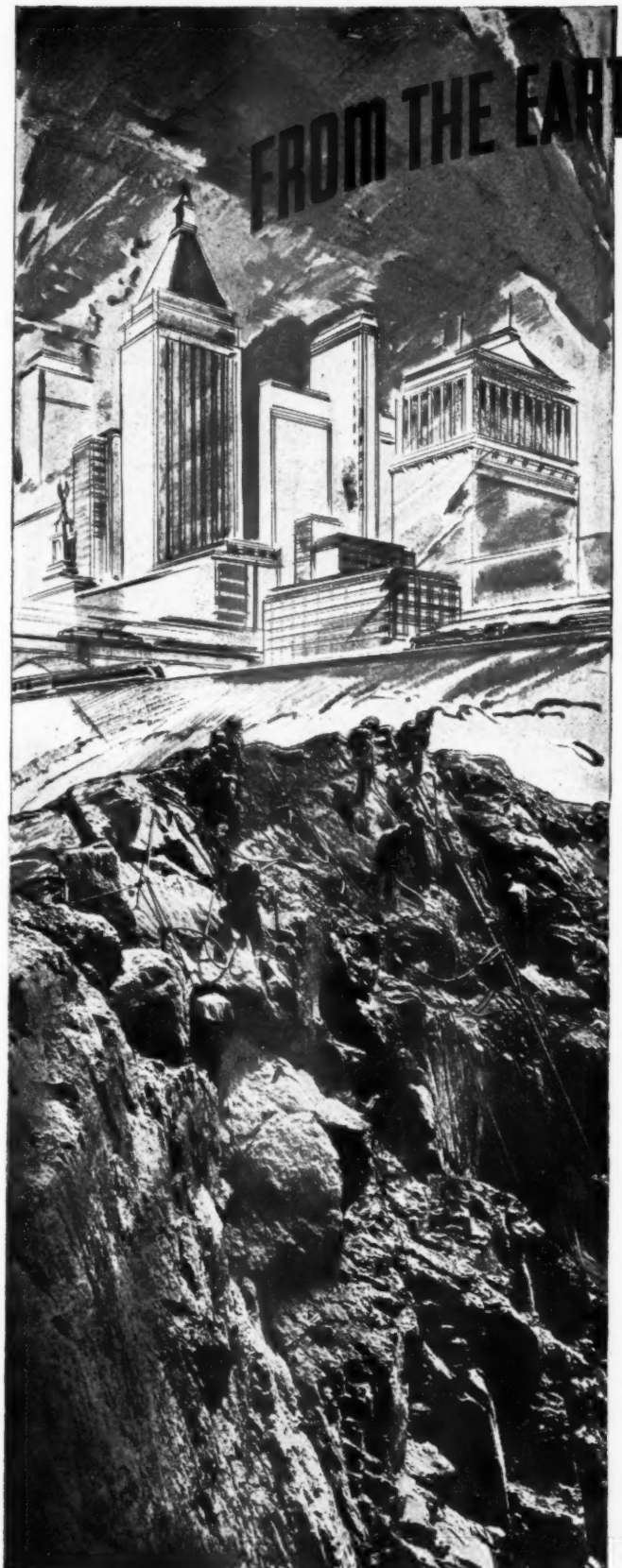
SOUTH MILWAUKEE, WISCONSIN, U. S. A.



A GREATER NATION ARISES

Our nation is built on a very desirable part of this earth's rocky crust. We have improved this crust by recovering and converting its products into the facilities and materials needed to build our progressive type of civilization.

It is honeycombed by our mines and tunnels, carved by our quarries, highways, railroads, canals and pipe lines. On its rocky base rest our skyscrapers, homes, and factories. From it come those materials—solids, liquids, and gases—which we need for all we produce, consume, and use.

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Ingersoll-Rand rock drilling equipment has contributed greatly to the successful completion of these significant projects. By drilling out and exposing the still hidden potentialities of the earth's rocky crust, even more vital assistance will be rendered in the years to come. This will help create that greater nation which is our destiny.

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CONTENTS

Vol. XXXVIII **November, 1944** No. 11

November Advertisers

Allied Steel Products, Inc. 614
American Chain & Cable Company, Inc. .....3rd Cover
American Steel Dredge Co., Inc. 584

Baker Manufacturing Co., The. 583
Barber-Greene Company 564
Bethlehem Steel Company 599
Brooks Equipment & Mfg. Co. . 615
Bucyrus-Erie Company 2nd Cover, 567, 593, 610, 613

Christmas Seals 563
Cleveland Rock Drill Co., The. 565

Detroit Diesel Engine Division of General Motors Corp. 566

Ensign-Bickford Company, The 589
Erie Steel Construction Co. 614
Euclid Road Machinery Co., The 591

For Sale (Classified) 616
Fruehauf Trailer Company .....4th Cover

Gatke Corporation 592
Goodyear Tire & Rubber Co., The 562

Haiss Manufacturing Co., Inc., George 596
Hayward Company, The 610
Hercules Powder Co. 611

Independent Pneumatic Tool Co. 603
Ingersoll-Rand Company 561

Koehring Company 600-601

LaCrosse Trailer & Equipment Co. 602
Leschen & Sons Rope Co., A. .. 607
LeTourneau, Inc., R. G. 569
Linn Manufacturing Corp., The 610

Macwhyte Company 585

Northwest Engineering Company 597

Onan & Sons, D. W. 563
Osgood Company, The 590
Owen Bucket Company, The .. 586

Preformed Wire Rope 605

Rodgers Hydraulic, Inc. 587
Rogers Brothers Corporation .. 594

Sauerman Brothers, Inc. 588
Sheppard Co., R. H. 595

Templeton-Kenly & Co. 608

Universal Engineering Corp. 568
U. S. Treasury Dept. War Bonds 609

War Advertising Council—Anti-inflation 608
Wellman Company, S. K., The.. 581
Wellman Engineering Co., The. 598

The New Frontier—by J. H. Mayer 570
Four Merritt Co. uses modern excavating equipment, including Bucyrus-Erie 2-cu. yd. and Bay City ½-cu. yd. draglines, and bulldozers to clear and drain swamp land of South Carolina to make it available for agriculture. Methods used make possible future reclamation of vast area of undeveloped potentially good agricultural land along Atlantic Seaboard so that it can support its share of the nation's population and contribute adequately to our national income.

Montana Copper Salvage 574
Modern equipment and excavating and hauling methods by C. & F. Trucking and Contracting Company make possible the reclamation of millions of tons of copper-bearing material from large tailings deposits, deep slime ponds and a 225-foot high ore dump for Anaconda Copper Mining Company.

China's Back Door 578
Small detachment of engineer officers and troops advise Chinese on reconstruction of Burma Road to provide two-way highway, 30 feet wide, with strengthened bridges and culverts, smoother curves and improved drainage and surface. Teach coolies to operate American road construction equipment.

Shots from the Firing Line 582
World's Largest Capacity Dragline Now Stripping Coal in Pennsylvania Field 582
Highway Research Board Meeting is Postponed 582
Maine's Postwar Program Amounts to $18,706,470 584
Maryland to Have $48,000,000 Plans Ready .. 584
$1,350,000,000 Federal Aid Highway Bill..... 586
Slate Production Decreases 586
New Jersey Highway Needs Total $521,770,000 588
Dump Trucks Important in South Pacific..... 588
American Highway Mileage 590
Permit Gold Mining Firms to Prepare for Re-opening 590
Plans Set for Disposal of Used Equipment.... 590
Need Landing Facilities for Postwar Flying ... 592
Copper Requirements 592
Excess Equipment Seen as Postwar Problem ... 592
Postwar Plans Need to be Expedited 594
Ask Ban on Indiana Highway Diversion 594
Consider Postwar Plans for Florida Highway ... 594
Distribution of Mining Machinery 596
Elect D. W. Winkelman Syracuse Bank Director 596
Oregon Highways in Good Condition 596
Almost $18 Billion Spent on Roads and Streets in Decade 596
180,000 Miles of Roads in Britain 598
Double Shovel Shipments in Second Quarter 1944 598
Plan $150,000,000 Flood Control Work in Kansas 598
Peruvian Road Saves Huge Mileage 602
Plan to Cut 3,000 Tons of Peat 602
Alaskan Cut-Off Road Abandoned 602

Not in the Contract 604

Obituaries 612
William M. Bager 612
Mark L. Reed, Jr. 612
William A. Anderson 612

Field Notes 614
Easing Shovel Hand Grip 614
Use for Quack Grass 614
Utility Air Compressor 614
Flashlight Signalling Attachment 614

Notes from the Manufacturers 615

New Trade Literature 615

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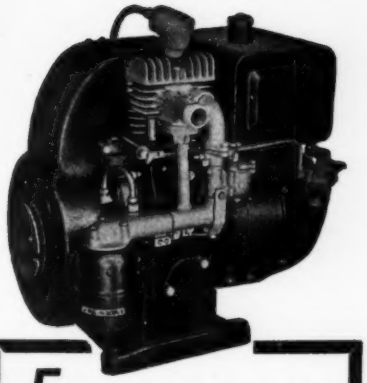

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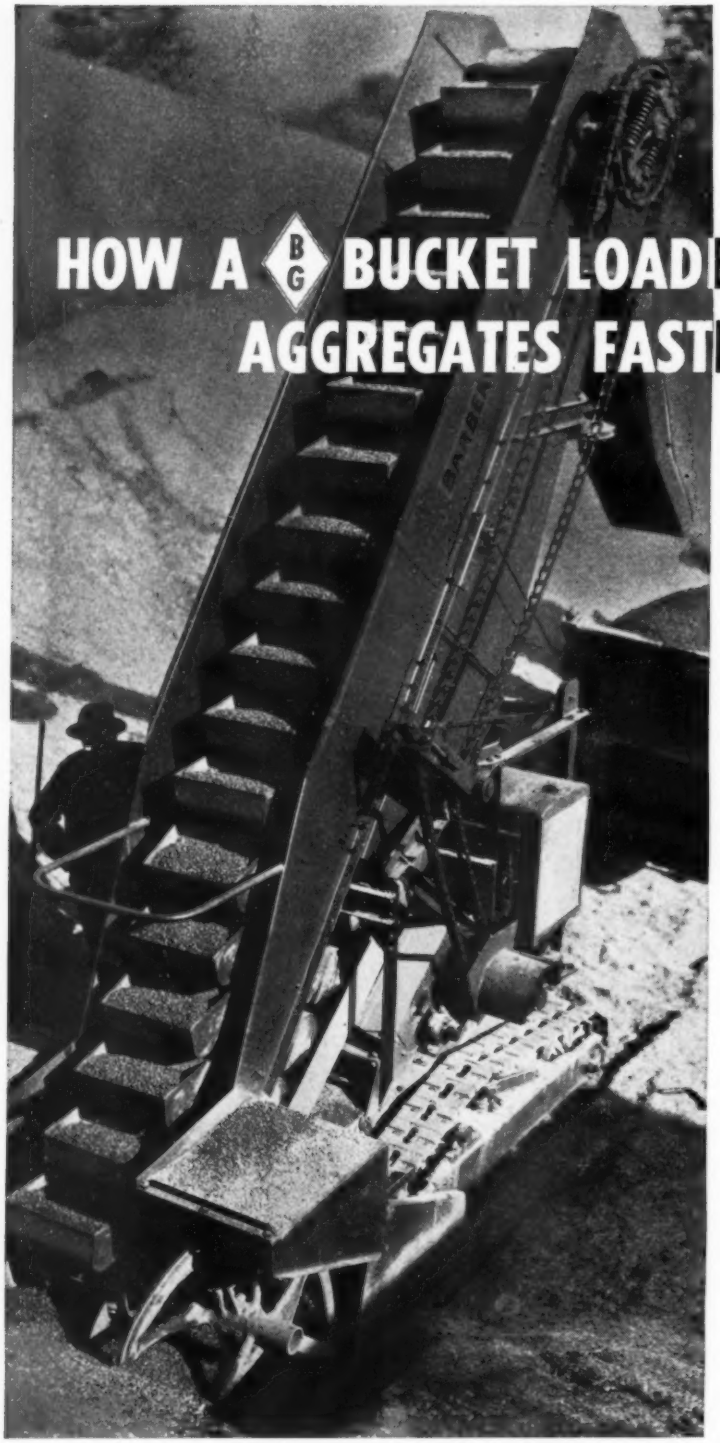

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You can save money by processing aggregate at a uniform rate, even during "off" seasons, and storing it in stockpiles.

A Barber-Greene will reload it into trucks, whenever needed, at exceptionally low cost. In fact, many operators have found that the saving in truck time alone justifies its purchase.

Continuous handling by the B-G Loader is extremely advantageous in feeding material to processing equipment — screens, crushers, belt conveyors.

The B-G Bucket Loader also can be used for stripping, light excavating, screening, and many other cost-saving applications.

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44-23

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2. Feed capacity is over 8 feet, and the Cleveland DR 30 handles depths to over 25 feet.
3. The recoil device holds machine to its work, and increases the drilling speed from 10 to 25%.
4. Forward leg point holds the drill and steel in line whether operating in down, flat or angle holes.
5. Centralizer keeps steel from "walking" when starting hole, prevents breakage of bit points.
6. The twin jack-screw mechanism permits easy moving of U-bar, and also shortens set-up time.
7. The main wheels swivel 90° for line drilling, and 180° in order to obtain narrower tread.

Ask for Bulletin 132

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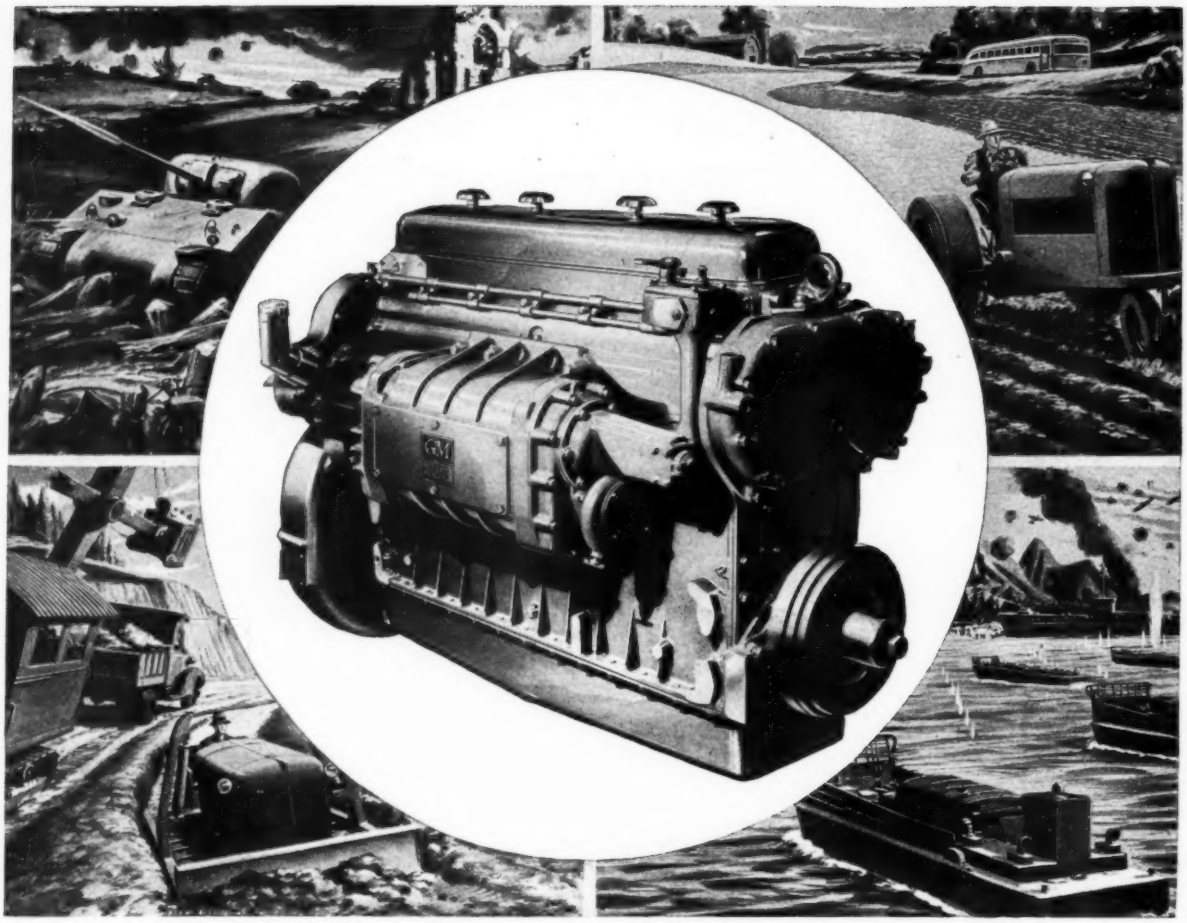

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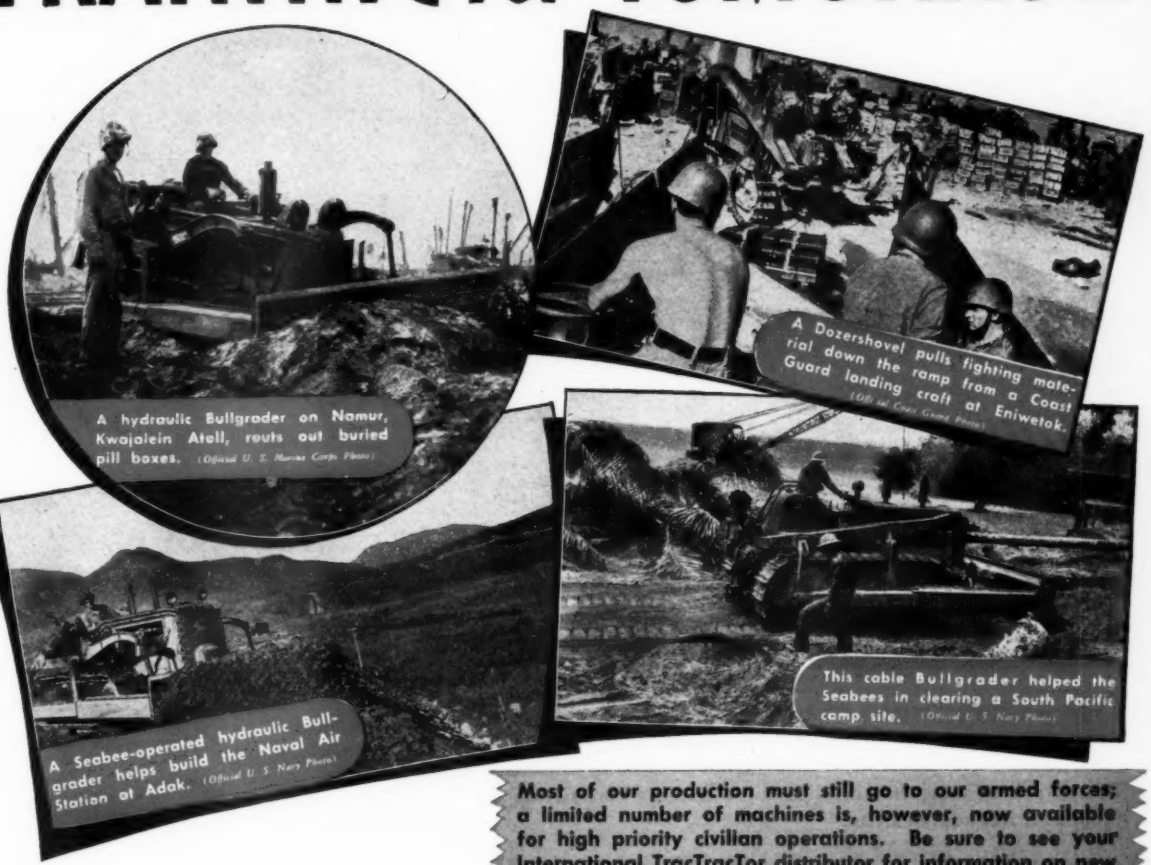

A hydraulic Bullgrader on Namur, Kwajalein Atoll, routs out buried pill boxes. (Official U. S. Marine Corps Photo)

A Dozershovel pulls fighting material down the ramp from a Coast Guard landing craft at Eniwetok. (Official Coast Guard Photo)

A Seabee-operated hydraulic Bullgrader helps build the Naval Air Station at Adak. (Official U. S. Navy Photo)

This cable Bullgrader helped the Seabees in clearing a South Pacific camp site. (Official U. S. Navy Photo)

Most of our production must still go to our armed forces; a limited number of machines is, however, now available for high priority civilian operations. Be sure to see your International TracTracTor distributor for information on new machines, rentals, and service.

To the men in the construction phases of Allied warfare, the fighting fronts are training courses, too — perilous, exacting, efficient. The earth-moving problems encountered are staggering, but the speed with which victories have been won attests to the skill these men have acquired. With Bullgraders, Bulldozers, Dozershovels, Scrapers, etc. as their weapons, they are writing a new page in military history.

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J. A. Gallagher, Madison, Wisc., contractor uses a Universal 546-P primary unit with 20" x 36" jaw crusher in Viroqua, Wisc. quarry. Plant is electric-powered.

Below: Beu & Sons use a 546-P primary unit with 20" x 36" crusher for primary reduction of limestone at Ackley, Iowa. Secondary plant has No. 4 Universal Pulverizer.

The 30" x 42" Welded Steel Plate Roller Bearing Crusher on this 546-P Primary Unit increases output for Art Overgaard's No. 1 plant at Cashton, Wisc. This is the third 546-P unit purchased by this operator.

Quarries step-up output with this UNIVERSAL Primary Unit!

These Universal Portable Primary Crushing Units greatly increase output for quarries because larger chunks of shot rock need not be rejected or sledged. In addition, they increase the output of secondary crushers by delivering material of a more uniform size to them.

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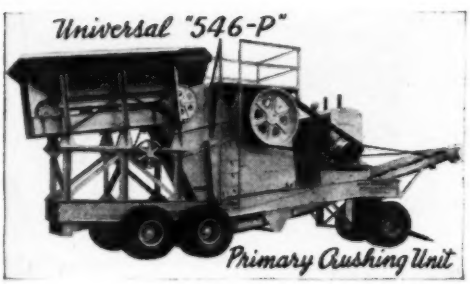

UNIVERSAL ENGINEERING CORPORATION
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• Outlet of Main Canal at flood stage. This canal drains the water from 3,000 acres of land.

The New Frontier

By J. H. MAYER
District Conservationist
Soil Conservation Service
Walterboro, S. C.

Four Merritt Co. uses modern excavating equipment, including Bucyrus-Erie 2-cu. yd. and Bay City ½-cu. yd. draglines, and bulldozers to clear and drain swamp land of South Carolina to make it available for agriculture. Methods used make possible future reclamation of vast area of undeveloped potentially good agricultural land along Atlantic Seaboard so that it can support its share of the nation's population and contribute adequately to our national income.

MORE THAN THREE million acres of potentially good farm land in South Carolina has not been developed because of inadequate drainage. This vast area, if properly drained and developed, would be well suited to the production of food and feed crops which are so badly needed during this period of emergency. These lands are located for the most part in the Lower Coastal Plain section of South Carolina, but there are similar areas found along many of the streams in the upper portions of the state.

There is evidence that some of this land was at one time under cultivation, having been drained, cleared and developed for agricultural purposes with slave labor or during periods when farm labor could be had at low cost. However, the major portion of this area has never been under cultivation and has been utilized only for the production of timber. The development of this land offers an opportunity for a readjustment of agriculture in South Carolina, and will make the shifting of population from unproductive, over-crowded sections possible. Agricultural leaders have for a number of years realized that good land must be made available to the rural population of this state, if a high standard of living is to be attained.

• R. S. Merritt (left) of Four Merritt Co. that excavated the Main Canal, and J. H. Mayer, District Conservationist, Soil Conservation Service.

Several years ago, Jeremiah Milbank purchased approximately 21,000 acres of land in Jasper County and started developing it as a farm enterprise and for use as a wildlife area. J. P. Graham, who for a number of years was County Agricultural Agent in Jasper County, S. C., is the superintendent of this plantation, known as Cypress Woods Farms.

In the very beginning Graham contended that in order for the livestock production goals for this farm to be realized it would be necessary to increase the production of feed crops and also to develop more land for the production of pasture grasses. Consequently, in March 1943, Milbank, through Graham, made application to the Jasper Soil Conservation District for a complete land-use plan on this farm. After this request for assistance was approved by the supervisors of the soil conservation district, a conservation survey map was made by a trained soils technician of the Soil Conservation Service.

The soils technician, in making a conservation survey, walks over the area thoroughly, bores holes at frequent intervals and studies the physical characteristics of the soil. He sketches the boundaries of the various soil types on an aerial photograph and indicates these types as well as the slope of the land, degree of erosion and present land use. This information indicates the capability of the soil for producing crops and on a basis of this knowledge, the planning technician makes recommendations as to the crops which should be grown on different portions of the land.

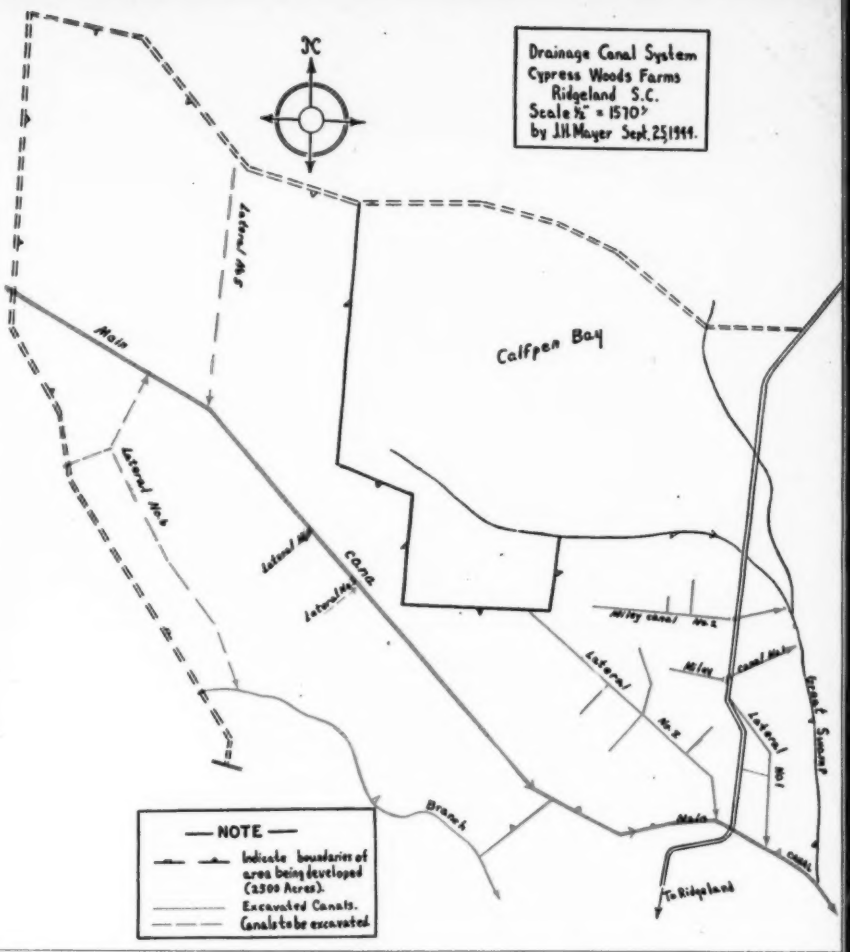
The farm conservation plan on Cypress Woods Farms was prepared by John Miley, Soil Conservation Service technician working in Jasper County, in cooperation with Graham. At that time Cypress Woods Farm had a breeding herd of 300 Black Angus cattle and was producing 5,000 Bronze turkeys and 300 top Hampshire hogs annually. The plan provided for the breeding herd of cattle to be increased to 1,500 head and for an annual production of 35,000 turkeys and 400 hogs. Mr. Graham, to further diversify his farming operations, has recently planted 50 acres to scuppernong grapes.

In 1943 only 605 acres of land were available for cultivation of feed crops and pasture. The farm plan showed that in order for sufficient feed to be available, it would be necessary for the cultivated land to be increased to 3,125 acres. There will be 171 acres of kudzu for the production of hay; 75 acres of which has already been planted. The improved pasture is

being increased approximately 1,000 acres. This area is to be cleared, and simple drainage facilities are to be established as needed, before pasture grasses are seeded. An area of approximately 2,000 acres of woodland is being intensively developed for quail shooting, and it is planned to practice approved forestry management on the entire woodland area of approximately 15,000 acres.

Agricultural Plans

It was determined that if the required production of food and feed crops were to be met, it would be necessary to drain, clear and put into cultivation approximately 2,000 acres of new land. An area of approximately 2,200 acres of extremely flat land was selected in the Western portion of the farm for this purpose. This selection was based on the soil types and their capability for producing feed crops. Bladen, Dunbar, Scranton, Portsmouth, and Bayboro soil types predominated. These soils have a sandy loam surface varying in depth from six to 18 inches and are underlain by clay and sandy clay subsoils which can be drained and are of a structure heavy enough to prevent excess leaching of plant food. Of this area, 200 acres were under cultivation at the time the farm plan was made, and 2,000 acres were covered with a scattered growth of pine and gum timber. It was obvious that the development of the 2,000 acres of tim-



• When rains set in it became necessary to work the Bucyrus-Erie 37-B dragline from mats, and because it was impossible to clear sufficient right-of-way in advance, the dragline was worked but one shift a day.

• **Upper Left: Caterpillar D-7 tractor equipped with a LaPlant-Choate bulldozer grubbing stumps on Cypress Woods Farm. Upper Right: When these stumps have been piled and burned this area will be ready for plowing. Inspecting the land are (left) F. L. Best, Bucyrus-Erie service engineer and Mayer. Left: Bay City Model 30 dragline piling stumps and logs which have been dragged to the machine by small tractors and teams of horses.**

ber land for cultivation would not be possible until adequate drainage facilities were established.

Drainage Survey

A drainage survey was started on this area July 5, 1943, and was completed in August. The drainage survey, design of the drainage system and plans were developed and technical supervision is now being given by Soil Conservation Service technicians under the supervision of the writer. These drainage plans included the excavation of a Main Canal four miles long and of approximately eight miles of lateral canals, and entailed the moving of 150,000 cubic yards of earth. The contract for clearing the right-of-way and excavating the Main Canal was let by Milbank to the Four Merritt Co., Charleston, S. C. The excavation of this canal was started November 29, 1943 under the supervision of R. S. Merritt and was completed June 1, 1944. A Bucyrus-Erie 37-B Diesel dragline with a 2-cu. yd. Hendrix bucket and 45 ft. boom was used on this job. The small lateral canals are being excavated by the Cypress Woods Farm with a ½-cu. yd. Bay City gasoline dragline on a rental basis.

The clearing of right-of-way was sub-let by the Four Merritt Co. to the American Construction Co. of Columbus, S. C. This work was started several weeks in advance of the excavation. The right-of-way followed a gum swamp the entire four miles. At the lower end, the swamp was only a few hundred feet wide but the upper end widened out as much as half a mile. The specifications provided for a 100-ft. right-of-way with 30 feet in the center for the canal and 10-ft. berms and 25 feet on each side for the logs, stumps and spoil.

A crew of laborers removed the undergrowth which was burned or piled along the outer edges of the 100-ft. right-of-way. A Caterpillar D-7 tractor with LeTourneau cable-controlled bulldozer, a Caterpillar tractor with Buckeye cable-controlled bulldozer, and an International TD-18 tractor with Bucyrus-Erie hydraulic bulldozer followed this crew and pushed the trees and stumps to the outer edges of the right-of-way, leaving a clear area of at least 25 feet on each side of the center line. Trees which were too large to be pushed over by the bulldozers were left standing and were "shot" with sufficient dynamite to make it possible for the bulldozers to remove them on the fourth or "clean up" operation. This method of clearing worked very satisfactorily for the first three miles of right-of-way.

After the first three miles of right-of-way were cleared, very flat topography was encountered, extended

• **Right: Operator Kermit Cahoon and oiler Tom Jones of the 37-B. Below: Bucyrus-Erie 37-B equipped with 2-cu. yd. Hendrix bucket completes excavation of Main Canal. Twenty-eight hundred acres of head water enter the canal at this point.**

rains set in (the heaviest in the history of the weather bureau), and the remaining right-of-way to be cleared was submerged under one and one-half to two feet of water for about 60 days. Since this area would not be dry enough for bulldozer operation again until mid-summer or the fall months and as the operation of the dragline was being held up, it was necessary to remove both the underbrush and timber by hand and pile this in the 25-ft. area along the outer edges of the right-of-way. All timber was sawed off at water level and the stumps standing in the area to be excavated (15 feet each side of center line of the proposed canal) were blasted with dynamite and later removed by the dragline as the canal was excavated.

Excavation

When the contract was let for the four-mile main canal, the contractor realized that the secret to making the job "pay off" lay in completing the maximum of work while the canal site was relatively dry and mats would not be necessary. Accordingly, two 11-hour shifts were used in operating the Bucyrus-Erie 37-B dragline for 22 hours each day, six days per week. The first two miles of the canal were excavated under this system. At this point the rains set in and it became necessary to work from mats and as there was not sufficient right-of-way cleared in advance, only one shift per day was used.

In all, 87,891 cu. yds. of earth were excavated. The canal had an average cross-section of 160 square feet, being eight feet deep, eight feet wide at the bottom and with side slopes of 1½ horizontal to 1 vertical. The material excavated consisted of a 12-inch to 24-inch layer of sandy loam surface soil high in organic matter. This was underlain by a tough mottled yellow and gray sandy clay.

The spoil was distributed uniformly on each side of the canal, leaving a 10-foot berm along each edge of the canal on which no material was deposited. Openings in the spoil were left at all depressions and at regular intervals not greater than 200 feet.

The main problem experienced on this job was transportation of fuel and the operators over water-logged flat woods. The fuel problem was partially solved by distributing fuel in drums along the right-of-way before the woods roads became impassible. To aid in this and to make it possible for the operators to drive to the job, large oversize tires, 9:00x13, were installed on a one-half-ton Ford pick-up truck. Without this innovation the job would have been shut down on many occasions.

• **Top: Main Canal three miles upstream from outlet. The canal is eight feet deep and has a bottom width of eight feet with side slopes of 1½ horizontal to one vertical at this point. Above: Entrance of a sub-lateral to Laternal No. 1 excavated by Bay City dragline.**

• **One-half ton Ford pickup truck equipped with oversize 9:00x13 tires to enable it to transverse water-logged swamp land.**

Lateral Canals

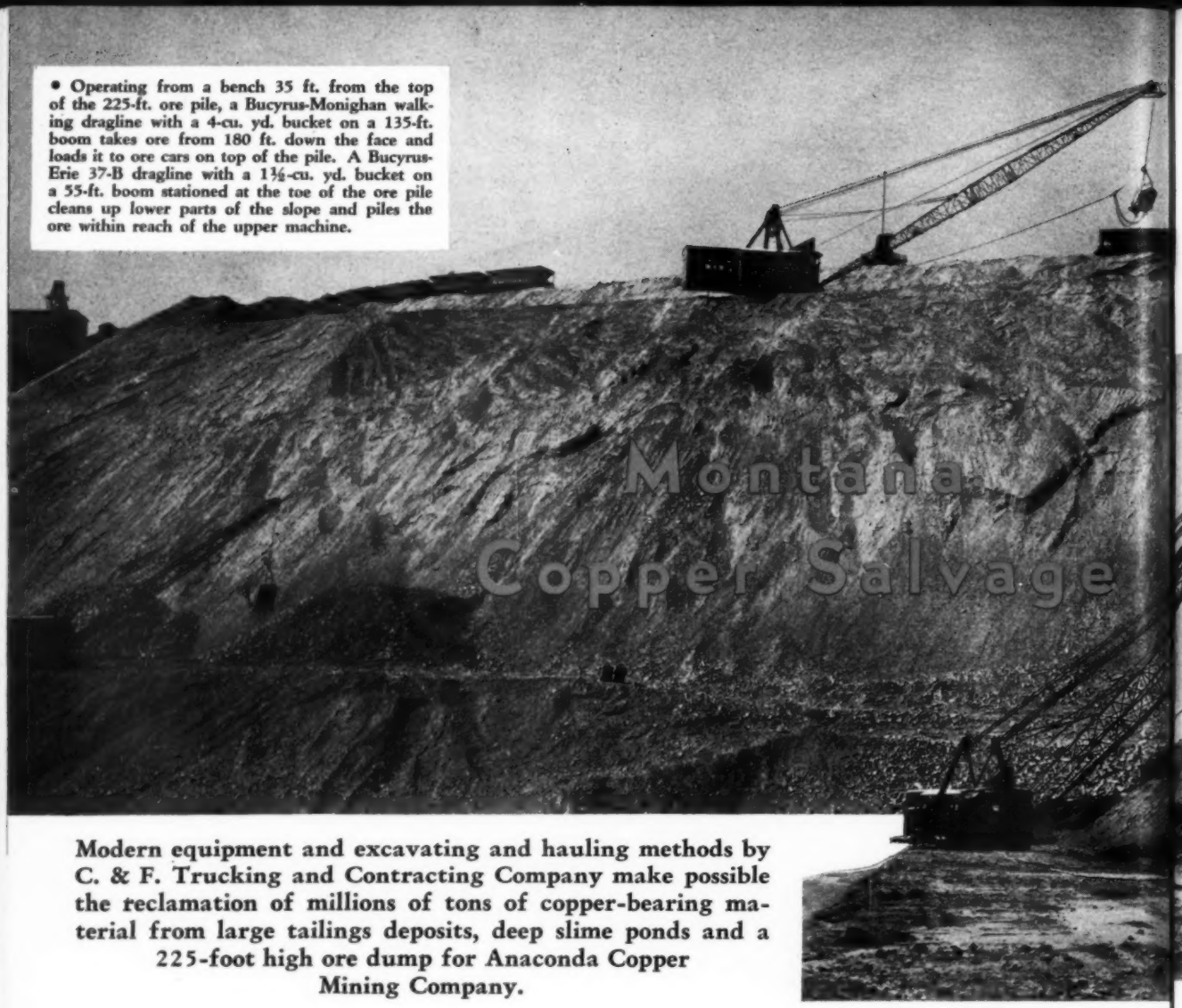
A Bay City dragline, Model 30, equipped with a ½-cu. yd. bucket is being operated by the Cypress Woods Farms for excavating the lateral canals and also for piling stumps in the land clearing operation.

This machine is the property of the Soil Conservation Service and is on loan to the supervisors of the Jasper Soil Conservation District. The district supervisors have in turn loaned this machine to the Cypress Woods Farms, who pay a fixed rental which is sufficient to maintain the machine. All costs of operation, operators, salary, fuel, oil, grease, cable and normal day by day repairs are also paid by the Cypress Woods Farms.

Three miles of laterals have been excavated with this machine. These laterals have an average cross-section of 57.5 sq. ft., being five feet deep, four feet wide in the bottom with 1½ to 1 side slopes. A total of 24,418 cu. yds. of earth was moved in digging these "minimum size" canals. There are approximately five more miles of this type canal to be excavated. The spoil from all laterals is to be spread with bulldozers to facilitate farming operations and also so that surface water can enter the canals readily.

Two major problems have been encountered in clearing this land for

(Continued on page 607)



• Operating from a bench 35 ft. from the top of the 225-ft. ore pile, a Bucyrus-Monighan walking dragline with a 4-cu. yd. bucket on a 135-ft. boom takes ore from 180 ft. down the face and loads it to ore cars on top of the pile. A Bucyrus-Erie 37-B dragline with a 1½-cu. yd. bucket on a 55-ft. boom stationed at the toe of the ore pile cleans up lower parts of the slope and piles the ore within reach of the upper machine.

Montana Copper Salvage

Modern equipment and excavating and hauling methods by C. & F. Trucking and Contracting Company make possible the reclamation of millions of tons of copper-bearing material from large tailings deposits, deep slime ponds and a 225-foot high ore dump for Anaconda Copper Mining Company.

THROUGH THE APPLICATION of modern excavating technique, the C. & F. Trucking and Contracting Company of Butte is moving more than 3,300,000 cubic yards in a big Montana copper salvage job.

Millions of tons of low-grade coppear-bearing materials, deposited as waste during generations of copper mining and pioneer smelting in the Butte and Anaconda vicinity are now being excavated and transported to the Anaconda smelter in a contract job for the Anaconda Copper Mining Company. The project is adding substantially to the output of copper obtained from mining operations only, and thus is boosting the output of this strategic metal from the "Copper State."

Immense tailings deposits, deep slime ponds and an ore dump more than 225′ high are being salvaged in an undertaking that is a tribute both to modern earth-and-rock excavating procedures and to modern milling methods.

Three salvaging operations and a hauling job comprise the major phases of C. & F.'s contract.

Ore Waste Dump

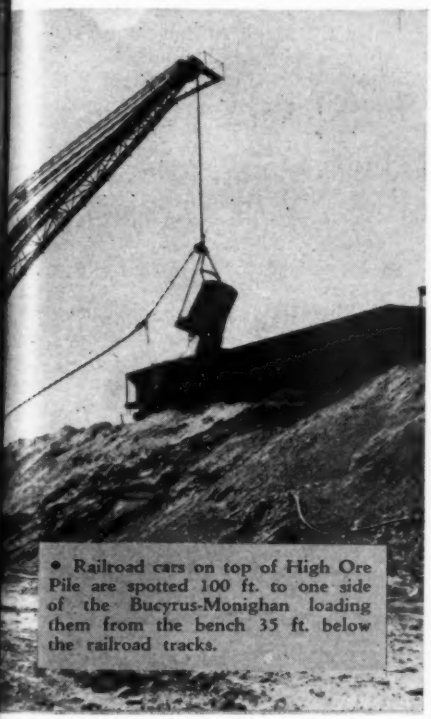
In the heart of Butte the High Ore Waste Dump, containing approximately 2,000,000 tons of low-copper-content materials is being retrieved for smelting. This dump is composed of discarded waste from several mines accumulated during early mining days when ore-production processes were less efficient than those of today and when only high-grade ore was profitably handled. Modern recovery methods and war demands for copper now make the working of this dump feasible.

The mine-run mixed coarse (from 1′ to ½″) and fine (from ½″ to dust) rock of which this dump is composed is hoisted from the bottom of the pile and loaded into railway ore cars for delivery to the smelter 24 miles away. Operating from a bench which was cut 35′ deep at the top of the pile, a Bucyrus-Monighan 5W equipped with a 4-cu. yd. Bucyrus-Erie type AX dragline bucket on a 135-ft. boom, pulls 180 feet upslope to load out railway cars, which set on the top of the pile and 100 feet to one side of the equipment. The machine is capable of loading out 200 to 250 tons of this low-grade material per hour on a continuous schedule, the total tonnage being limited only by the capacity of the smelter.

Because only three per cent of the tonnage to be handled is in the lower 45 feet of the ore pile, it was not considered economical to install a Bucyrus-Monighan capable of reaching out some 200′ from its position at the top of the pile to pick up ore from the toe of the slope 225′ below. Instead, a Bucyrus-Erie 37-B drag-

This article is reprinted in substance from the October, 1944, issue of Pacific Builder and Engineer.

line equipped with a 1½-cu. yd. bucket on a 55-foot boom was stationed at the toe of the pile. Its job is to clean up lower parts of the slope and pile the ore within reach of the bucket of the Bucyrus-Monighan above. The 37-B completed its assignment in the early part of the contract, last May.



• Railroad cars on top of High Ore Pile are spotted 100 ft. to one side of the Bucyrus-Monighan loading them from the bench 35 ft. below the railroad tracks.

In a skillful handling of the big Bucyrus-Monighan dragline, the operator swings the boom out over the slope, pulls the bucket in close to give it an outward swing in the drop, and spots it far below and some 50 feet beyond the end of the boom to begin its bite just under the pile built up by the lower dragline. No operators were available with experience in this type of work, so those selected had to be taught.

"Use of the Bucyrus-Monighan is proving by far the most economical method of handling this particular material," says the contractor. "Its saving in manpower, rubber and gasoline over previous methods of excavation formed the basis of allocation by which the WPB permitted us to purchase the 5-W Bucyrus-Monighan for this use."

In this operation, one dragline, one dozer and five men do the work of one shovel, one dozer, five trucks and 11 men (based on preliminary work done the previous season with a smaller shovel). In addition, the combing of the slope by the dragline bucket teeth reduces the moisture content of the surface material approximately 1½%—enough to change its character from a sticky material, difficult to handle, to a substance that slips readily out of the ore cars. Thirty cars per day was a good record the previous season, for it sometimes took two hours to get the sticky material out of the cars at the smelter. Now, the output is generally 45 to 55 52-ton ore cars per 12-hour day, while the maximum output is 86 cars in a 16-hour day.

New Works Tailing Pond

Along the base of the slope below the smelter at Anaconda, large areas are covered with residue sluiced from early day smelting operations. These yellowish tailings, built up to depths as great as 45 feet and covering many acres, now form a mass having the character of coarse, damp sand. This residue is now being excavated and hauled back to the smelter for reworking. The value of its copper content amply justifies the cost of handling and reprocessing.

Here again, the use of excavating "know-how" has greatly stepped up production of vitally needed copper. By replacing the company's previously used clamshell bucket and crane with a Bucyrus-Erie 44-B 2-cu. yd. diesel shovel, production has been increased from ten up to as many as fifty-five 52-ton cars per eight-hour day. This production at times totals up to 112 cars daily. Movement of tailings to the smelter is by standard ore cars run on track kept shifted close to the face of the deposit.

Making a cut 50 feet wide along the full face of the deposit, the shovel loads to cars by a one-fourth ton average swing. This minimum movement speeds up loading and produces minimum wear on equipment.

Chemical interchange of metals adds to the difficulties of equipment wear and parts replacement. By slow chemical activity the copper salts in the tailings react with the tough iron in the bucket, giving the bucket the appearance of being copper plated. This soft copper is easily worn away by the abrasion of operation. Hence, in spite of the build-up of vital parts by welding, the bucket becomes a thin shell, ready for the junk pile in less than a year. Dozer blades and cat tracks likewise have their effective life reduced, though not so rapidly.

Tailings lying in high, shallow areas around the edge of the deposit are channel-dozed into piles for shovel loading. This is done by an Allis-

EQUIPMENT

Included in the equipment used by C. & F. Trucking & Contracting Company on its five-operations for Anaconda Copper Mining Company are:

High Ore Waste Dump
- 1 Bucyrus-Monighan 5W with 4 cu. yd. Bucyrus-Erie type AX bucket on 135' boom.
- 1 Bucyrus-Erie 37-B dragline with 1½ cu. yd. Bucyrus-Erie bucket on 55' boom.
- 1 International TD18 tractor with Bucyrus-Erie hydraulic dozer.

Valley Slime Ponds
- 1 Koehring 604 dragline 45' boom, 1¼ cu. yd. Page bucket.
- 1 International TD18 with Bucyrus-Erie hydraulic dozer.
- 1 Caterpillar No. 12 motor patrol.
- 1 General Motors Company T84 with General Motors Company semi-trailer mounted with Wood 10-cu. yd. body and Wood telescopic hoist.
- 10 General Motors Company 603 and 623 tractors.
- 8 Fruehauf jeep semi-trailers mounted with Wood 8-cu. yd. body and hoist and 10-cu. yd. ends.
- 1 Fairbanks - Morse portable truck scale, 60,000-lb. capacity.

Haul Road Reconditioning
- 4 Allis-Chalmers HD14 tractors.
- 2 Wooldridge 14-17 cu. yd. Terra Clippers.
- 1 LeTourneau 10-cu. yd. Carryall.
- 1 Koehring 603 1½ cu. yd. shovel.
- 8 to 12 miscellaneous dump trucks, 4 to 6 cu. yd. capacity.
- 1 Caterpillar D2 with LaPlant-Choate hydraulic dozer.

New Works Tailings Ponds
- 1 Bucyrus-Erie 44-B 2-cu. yd. diesel shovel equipped with Buda Lanova diesel motor.
- 1 Allis-Chalmers HD14 tractor with Carco cable-controlled angle dozer.
- 1 Model M Allis-Chalmers tractor.

Yard and Portable Lubrication
- 1 Graco Model LU100 outfit made by the Gray Company, Inc., Minneapolis, Minn.

Hauling Equipment

The C. & F. Trucking and Contracting Company has a fleet of 50 trucks including:
- 1 Peterbilt hauling and equipment-transport trailer made by Union Iron Works, Spokane.
- 2 Macks.
- 1 White.
- 2 Chevrolets.

All the rest are General Motors Company, as the company is standardizing on General Motors Company, 23,000 to 43,000 lb. gross trucks.

• **Above: Bucyrus-Erie 44-B 2-cu. yd. diesel shovel loads as many as 55 52-ton cars per eight-hour day with tailings from early smelting operations. The tracks are shifted so as to be kept near the excavating face. These tailings cover many acres and are up to 45 ft. deep. Left: Allis-Chalmers HD-14 tractor equipped with Carco cable-controlled angle-dozer pushes into piles for shovel loading tailings lying in high, shallow areas around the edge of the deposit.**

P B & E Photo

Chalmers HD-14 tractor equipped with a Carco cable-controlled angle-dozer. The tractor also is employed to shift track when necessary to the face of the new cut. An A-C model M tractor is kept busy much of the time spotting empties for loading, and pulling loaded cars down the line for later movement to the smelter.

In certain sections of the pit, moisture content of the tailings offers cave-in hazards on high cuts which endanger men and equipment. As a counter measure, 3"x12' holes are put down with augurs and shot with small charges of powder to lower the face height and give it a safe angle of repose.

Recovering "Slimes"

More than a million tons of smelter "slimes" are being recovered for their copper content by still another excavation and haul operation. This work is carried on at Butte from May until September, and near Warmsprings, in the Deer Lodge Valley, seven miles from Anaconda, the balance of the year. The alternate operational periods are necessary because of temperature conditions in handling the residue. The same excavating equipment is used in both places.

In early mining days, concentrators were able to recover only a small proportion of the copper-bearing sulphide from the finely ground "slime" portion of the ore feed. Fortunately, the slime was allowed to accumulate in large settling ponds, the clear excess water was drained off, and in more recent years these areas have been allowed to "dry". The result is that the copper sulphides in the top two feet have been leached out but beneath this layer, the material is in almost the same condition as laid down originally, that is, a sticky, 30% moisture-bearing mass of particles as fine as flour.

The barren overburden is first stripped and cast back into the hole from which material already has been removed, or stacked alongside (in the case of the first cut), to be 'dozed into the hole later. A Koehring 604 dragline with 45-ft. boom and a Page 1¼-cu. yd. bucket does the excavating. Because of its stiff sticky texture, the material piles so high in the bucket that three passes fill an 8-cu. yd. semi-trailer.

The slime is trucked seven miles to Anaconda from the Warmsprings location, and is shipped in ore cars 20 miles to Anaconda from Butte. Operations at Butte can only be carried on during summer months because the material contains 30% water and would freeze so hard in ore cars during winter weather that dumping would be impossible by the time the shipment reached the smelter. But the trucks can rush loads from Warmsprings before freezing is effected. Slimes have been successfully trucked there in temperatures as low as minus 20° F. taking no precaution beyond the customary one-inch sanding of the truck bottoms which is done for easy dumping regardless of the weather.

Nine Fruehauf jeep semi-trailers, mounted with Wood 8-cu. yd. body and hoist equipment (with 10-cu. yd. ends) are hauled by GMC 603 and 623 truck tractors. Two extra tractor units permit periodic overhauling of equipment. One GMC T84 truck-tractor with a GMC semi-trailer is also used. This semi-trailer is mounted with a Wood 10-cu. yd. body equipped with a Wood telescopic hoist. A TD18 International tractor equipped with a Bucyrus-Erie dozer

• **Koehring 604 dragline with 1¼-cu. yd. Page bucket on a 45-ft. boom loads smelter "slimes" to 8-cu. yd. semi-trailer trucks which haul them to the smelter plant at Butte. The barren overburden is first stripped by the dragline and cast back into the hole from which material already has been removed. The International TD-18 tractor and Bucyrus-Erie bulldozer in the foreground is dozing off overburden. The bulldozer also has the cleaning up job around the dragline.**

P B & E Photo

has the cleaning up job around the dragline and dozes off the overburden.

On this job they "work around the clock." Three eight-hour shifts put out about 2500 tons every 24 hours, with the only lost time being three 20-minute lunch periods in midshifts. As in the other operations, the tons of material moved are limited only by the amount the smelter can handle and not by the abilities of the excavating and hauling equipment to "put it out." The slime is so constituted that it cannot be stored in bins but must, instead, be kept in continuous flow from the pond to processing unit.

Each truckload is weighed on a portable Fairbanks-Morse truck scale with a capacity of 60,000 lbs. The scale is set alongside the haul road at a point where the trucks must stop prior to crossing a railroad. At the smelter the load is dumped into a roadway hopper. This hopper serves big agitating basins which liquify and thoroughly mix the slimes for treatment.

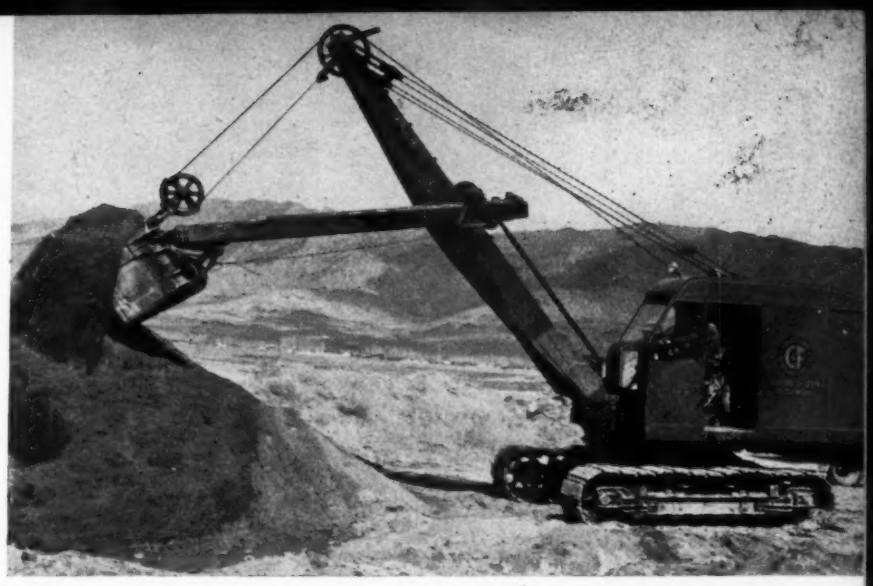
Building the Haul Road

In connection with this part of the C. & F. contract a road job deserves more than passing mention. As a job economy the contractor reconditioned seven miles of road, during freezing weather, between November 8 and December 19, 1943, the start of slime hauling operations. More than 70,000 cubic yards of roadside borrow or end borrow (in swamp areas) were moved for fills.

Three HD14 Allis-Chalmers tractors, pulling two Wooldridge 14-17 cubic yard Terra Clippers and one LeTourneau 10-cu. yd. Carryall aided by one Allis-Chalmers HD14 push tractor, were used on the road work

• **Upper: "Slimes" are weighed enroute to the smelter. Below: Fruehauf semi-trailer dumping a 12-ton load of "slimes" into a mixing hopper at the Anaconda smelter.**

P B & E Photo



• **Link-Belt Speeder ¾-cu. yd. shovel stripping overburden from sand pit. The sand is used for backfilling slopes.**

P B & E Photo

in temperatures as low as 0° F., the fill freezing as it was placed. Only one 10-hour shift per day was worked because of the short winter daylight periods and cold weather. End haul was done by eight to 12 miscellaneous four to six cubic yard dump trucks loaded by a 1½-cu. yd. Koehring 603 shovel.

Fill was leveled by a Caterpillar D2 tractor equipped with a LaPlant-Choate hydraulic 'dozer and compacted by the wheels of the hauling equipment breaking tracks over the fresh fill. The gravel top-course was placed in three-inch lifts to a total depth required by the characteristics of the fill below. Maintenance is by a Caterpillar No. 12 Motor Patrol, which also on occasion helps the trucks over soft spots in the grade that show up on warm days.

An Austin-Western duplex plant produced all gravel for the job. Pit-run material was put over a 3'x10' scalping screen. Rejects went through an 18"x38" primary breaker into a secondary plant consisting of a 22"x 40" secondary roll crusher and a 4'x12' screen. All conveyor belts on this plant are 30 inches wide. It is equipped for highway haul with 16 1100-20 tires and two LowMast rubber belt conveyors. It can be set up ready to run in 16 hours and taken down to move in eight hours.

Servicing the Trucks

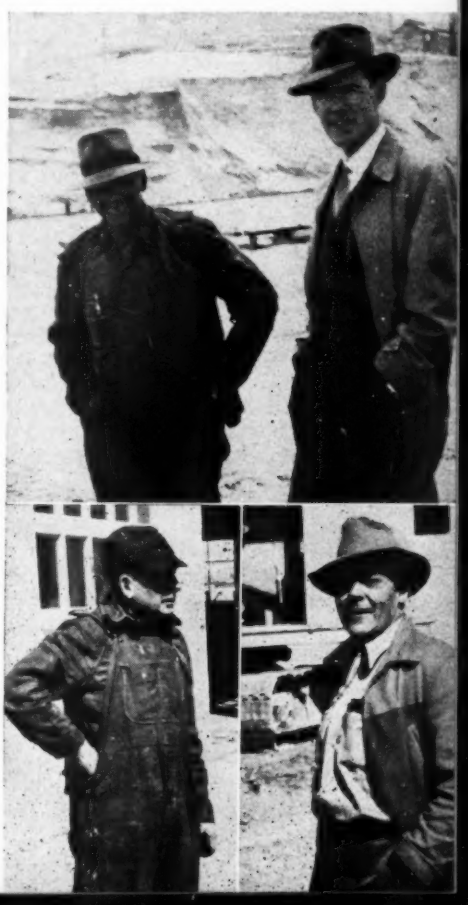
Servicing of equipment is of especial importance in this operation, for the haul road, due to winter construction, can not be oiled until the frost is out of the frozen fill; consequently clouds of dust rise from the road as the trucks travel 20 m.p.h. when loaded and 35 m.p.h. when empty.

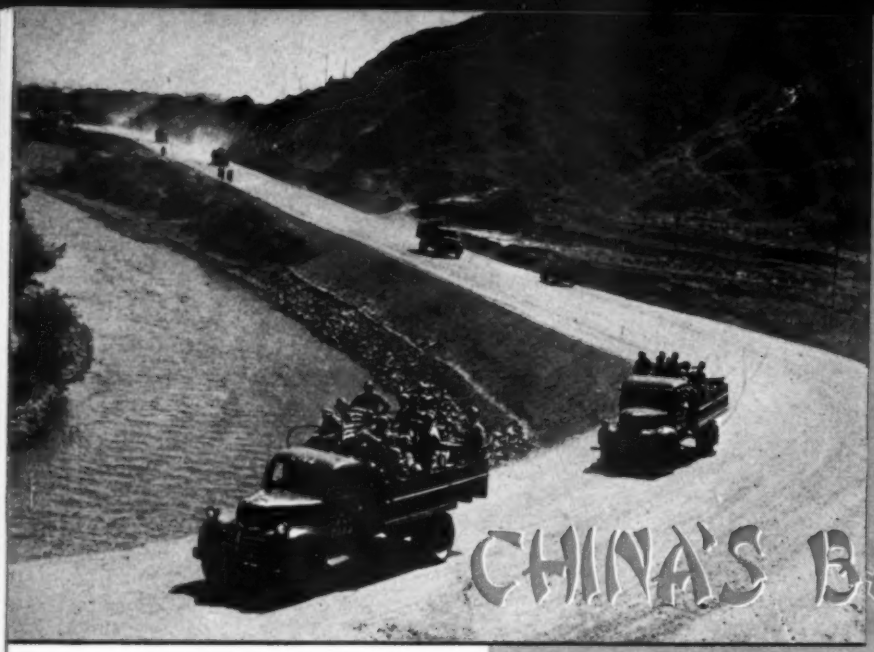
During last winter and early this spring, one greasing every two days was given a truck, but in warmer dusty weather each outfit receives a complete greasing and check-up each day. For this purpose each driver runs his truck into the shop daily and

(Continued on page 608)

• **Top left: Hans Young, foreman on the tailings job. Top right: L. M. Sheridan, manager of C. & F. Trucking and Contracting Company. Bottom left: Jim O'Neill, master mechanic. Bottom right: Louis Mohr, general superintendent.**

P B & E Photo





• Chinese Army troops, accompanied by American Engineers of the Y-Force Operations Staff, head for the front in the Salween River campaign in a motor convoy down that portion of the Burma Road in Chinese hands. Following the initial crossing of the Salween, the Chinese troops accompanied by American liaison officers, pushed forward through mountains west of the river in a pincers movement, coordinated with the drive of Lieut. General Joseph W. Stillwell's Chinese troops in North Burma, designed to break the Japanese blockade of the Burma Road so supplies can be brought into China from Burma.

CHINA'S BACK DOOR

Small detachment of engineer officers and troops advise Chinese on reconstruction of Burma Road to provide two-way highway, 30 feet wide, with strengthened bridges and culverts, smoother curves, and improved drainage and surface. Teach coolies to operate American road construction machinery.

(Note: This story of the Burma Road Engineers has been approved by the U. S. Army Press Censor and passed by the Chinese Ministry of Information.)

TO REOPEN THE ancient Burma Road to modern military traffic behind conquering Chinese and American troops is a battle against mountains, rains, rockslides, accidents, and age-old ideas which taxes one of Uncle Sam's smallest, but most potent forces in the present war—the Burma Road Engineers.

The general route of the Burma Road has been open for centuries. It is believed by many that the rocky trail was that once followed by Marco Polo in the Thirteenth century. Being at the backdoor of China there is no doubt that it was once the route of bandits and smugglers. Many times surveys were made on routes for railroads or highways from India to China, but always they were given up in the face of the Himalaya Mountain barrier. First effort to improve the Burma Road was made in 1912 when the rocky horse trail from Kunming to Anning was improved. Work was pushed on to Siakwan in 1930 and the Burma Road had then 413 kilometers (about 250 miles) of good road.

All of this construction was without the benefit of engineers. The old Chinese impression was that where a truck can move, there is a road. In the early days of the war, when the Chinese ports were grabbed by the Japanese, thousands of coolies were started on the task of making the road all the way down to Lashio. And for months it buzzed with truck traffic carrying lend-lease supplies. That construction work and that operation were the admiration of the world. But still this highway carved out of mountains, crossing percipitous chasms, and subject to all kinds of weather hazards, offered almost insurmountable operating problems. It was no two-way highway. Later it was completely shut off by Japanese aggression. Only a small amount of the road machinery was in China. This machinery was let to rust and deteriorate. Trucks also disintegrated. Tires and wheels from them became the backbone of the two-wheeled cart traffic in Southwest China.

Military Situation

The Burma Road, from the railhead at Lashio in Burma northwesterly to Kunming, provincial capital of Yunnan, in China, was for the early years of China's struggle against aggression the most important "back door entrance" for supplies. When that gateway was closed by the Japanese in 1942 an aerial supply line over the Himalayas was developed by the U. S. Air Transport Command, and, successful as it has been in more than replacing the volume of the old Burma Road route, supply has continued to be the limiting factor in the Battle for China.

Prime mission of the China-Burma-India Theater of Operations, commanded by General Joseph W. Stilwell, has been to open a land supply route into China. By mid-1944 success appeared certain. The Ledo Road was being driven down the Hukawng Valley behind the Chinese and American troops heading for Myitkyina, a key city in Northern Burma.

The strong Chinese Expeditionary Force, commanded by General Wei Li-Huang, and assisted with technical advice, supplies and training by the Y Force Operations Staff, of which Brig. General Frank Dorn is chief of staff, crossed the Salween River and aimed to push the Japanese out of Southwest China. To serve this force the old Burma Road had to be reconstructed. Engineers working on this project had a long-range view—not only was the Burma Road to be a supply line for the Chinese forces, but eventually a route on which sup-

All photographs used to illustrate this article are through the courtesy of the U. S. Signal Corps.

plies would roll from United Nations via India into China.

Myitkyina, which yielded to General Stilwell's forces early in August, 1944, is on the Irrawaddy River and also at a railhead, giving rail and water communications with Central Burma. To complete the land route from Assam in India to Yunnan in China, new construction will be pushed eastward from Myitkyina to join with the construction of a new highway from Lungling to Tengchung.

For 30 miles east of the Salween River the old Burma Road was made a barrier to the Japanese when they threatened to push northward into Yunnan in 1942. Deep tank traps mar the surface of the road and have been overgrown with vegetation. Kilometer 709 to Kilometer 734 had been completely destroyed.

Chinese press has reported surveying parties working between Myitkyina and Tengchung preliminary to reconstruction of ancient trails for building of new routes. Tengchung, where Chinese troops have been battling Japanese, is a walled city and the first ancient fortress town to come under direct siege in the present war.

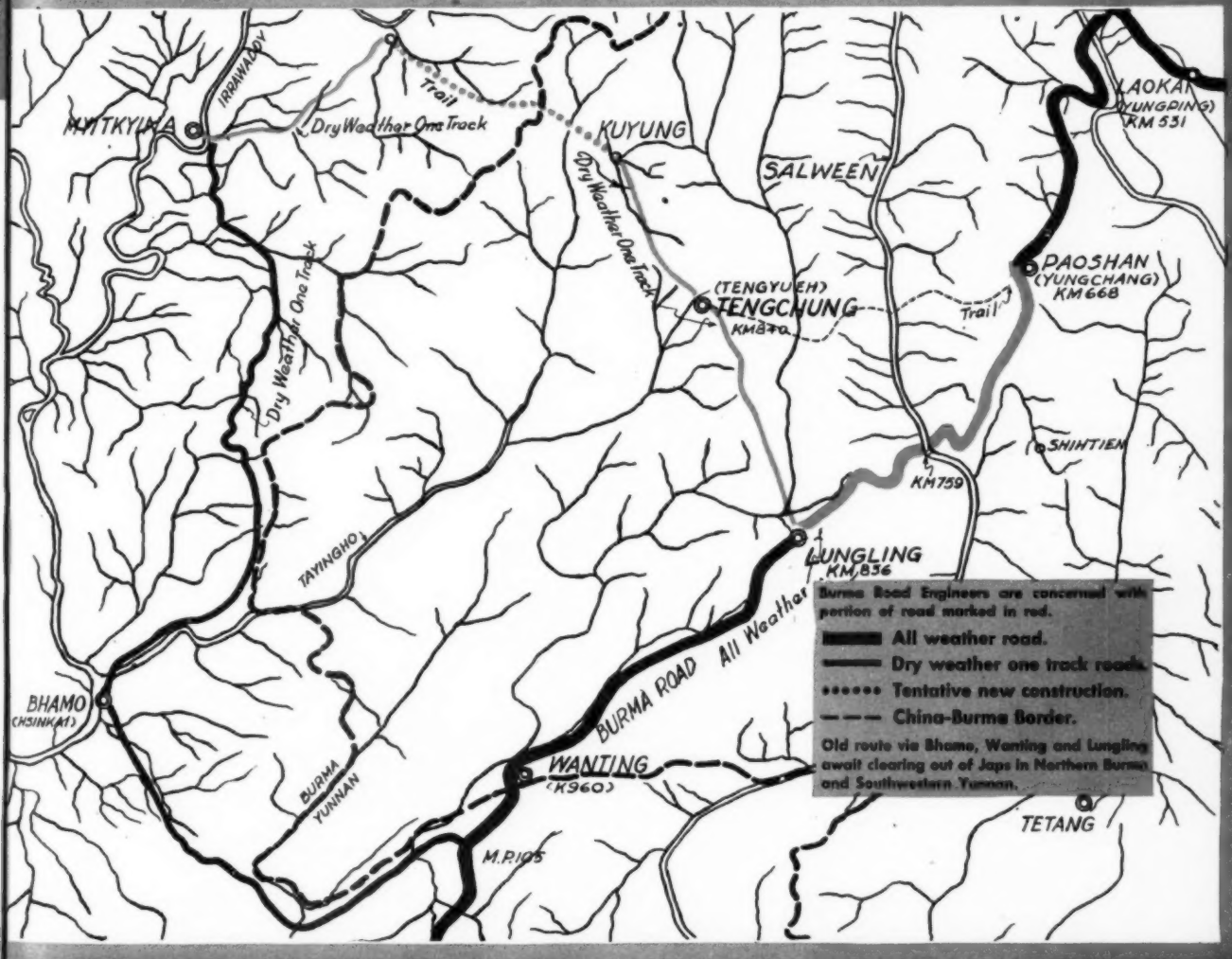
At such time as the Japs may be pushed down into Central Burma, and Bhamo is cleared, some sections of the Burma Road south of Lungling may be used to get traffic rolling ahead of new short-cut construction farther to the north.

Organization

The Burma Road Engineers was created as a subdivision of the China Training and Combat Command, United States Armed Forces, China-Burma-India, by order of General Stilwell, effective June 15, 1944, and attached to Services of Supply for operation. This unit is commanded by Lt. Col. Louis Y. Dawson, Jr., CE, of Charleston, S. C., who has been on the job since it was a one-man mission.

The Burma Road Engineers, as a unit, is attached to and has headquarters with Advance Section 1, Services of Supply, in Southwest China, commanded by Colonel Robert R. Neyland, CE, and serves as advisory to the Yunnan-Burma Highway Engineering Administration, the Chinese Expeditionary Force and with the Y-Force Operations Staff, of which Brig. Gen. Frank W. Dorn is chief of staff.

Major Harvey W. Gehr, Indiana, Pa., formerly with the Pennsylvania State Highway Department, is executive officer to Col. Dawson. Major William T. Moore, Jr., Camden, Ala., is bridge engineer for District 1 to 3 and is responsible for the preparation of plans and improvements for all bridges in the three districts. Major Camden P. Fortney, Charleston, W. Va., is in charge of preparation for bridge plans for improving and strengthening structures on the road in Districts 4 to 6. Each of the six districts has a district engineer. Captain Floyd A. Baker, Denver, Colo., commands that part of the detachment located at Siakwan, the main



• Volunteers from nearby country villages along the Burma Road in China—men, women, boys and girls —assisted in reconstruction work on the road when pre-monsoon rains caused landslides and washouts and hampered movement of men and supplies to the Salween River front.

supply and repair base of the organization.

The Yunnan-Burma Highway Engineering Administration is the Chinese organization which does the work of construction and is organized similar to state highway departments in this country. Director C. C. Kung is chief engineer and his assistant is L. Y. Shen. Chief bridge engineer is H. C. Hung. There are district engineers for the six of the nine districts now in the hands of the Chinese. Mr. T. C. Yuen is a liaison engineer with the American group and Tong Wan Ti is head of bridge engineering in Yunnan Province on behalf of the Central government.

The YBHEA has a steady year-round force of 2,000 men, but at times of emergency and heavy work there are more than 30,000 men and women employed on a single section. Magistrates of the district levy a draft upon each hsien for a certain quota of workers. These coolies live and eat on the road. They carry rock and soil with baskets. It takes 50 baskets to move a cubic meter (there are about 1.307 cu. yds. to a cubic meter) of material. The size of the task may be imagined when it is considered that paving the Burma Road thus far has necessitated the crushing by hand of more than a million cubic meters of rock.

Currency inflation plays a part in operations. During December, 1943, coolies were paid $27.50 per cubic meter and now the payment has jumped to $200 to $300 — Chinese funds.

• Marshall Wei Li Huang, commander of the Chinese Expeditionary Force charged with the task of breaking the Jap blockade of the Burma Road.

Cooperation

There are more than a thousand Chinese to every American soldier on the Burma Road work. They cooperate well—probably better than on any other joint project. The American engineer officer heading each district acts as an advisor to the Chinese district engineer. The rest of the American troops are organized as shock troops for special jobs or as instructors on special modern equipment that trickles in by air transport.

The American engineer must know intimately his district and recommend the work that appears most important and necessary to accomplish the main mission. His task is to suggest, explain and convince. But he never gets into an argument with a Chinese engineer and the Chinese engineers are final authority. If there are differences of opinions the points are relayed to Col. Dawson who discusses them with Director Kung. Tact, therefore, plays as important a function as engineering skill and the system has built a fine spirit of accord and good will results. The Chinese government has officially named Col. Dawson a consulting engineer to YBHEA.

Colonel Dawson arrived in Karachi, India, by air from Washington in October, 1942. He was Base Engineer for Base Section 1, Services of Supply, under Colonel F. H. Kohloss, CE. Within three days they flew to China and in November, 1942, the Eastern Section, SOS, was set up. Later the organization grew into Y-Force Operations Staff. There were eight officers in the original group and they came on a mission to China to teach the Chinese the American system of supply and to provide for a supply of material, munitions and equipment for the Chinese.

At this time the Chinese were busy destroying sections of the Burma Road to prevent the Japanese from using it as an invasion highway into the heart of Southwest China.

In May, 1943, Col. Dawson was section Engineer for China and his task then was mainly to work with the Chinese on the Burma Road. A Chinese Expeditionary Force was organized and a C.E.F. Services of Supply, commanded by Lt. Gen. Ching Cheh, set up with Major General Ho Ghia Lai, graduate of Command & General Staff School at Fort Leavenworth, Kansas, executive officer. The engineering mission then was to improve the Burma Road so that two-way traffic to supply Chinese troops in the area could be maintained.

On January 3, 1943, a joint inspection party went down the road to lay plans for the big task. It was found that the Chinese had built, almost entirely by hand and without engineering advice, about 600 miles of highway from Kunming to Wanting on the border of Burma. It was on this first inspection trip that the

(Continued on page 606)

At the control panel, this project engineer is studying the results of a test on one of the many Wellman dynamometers.

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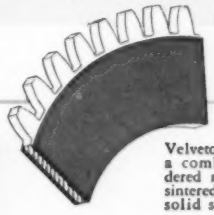
Interesting Facts About FRICTION

If two rubbing surfaces are separated by a film of oil, the friction is almost independent of the nature of the surfaces.

As shown in the illustration, a 10 lb. block sliding on a non-lubricated surface, requiring 2 lbs. of force, has a .2 coefficient of friction. When the surface is lubricated, however, the force required is only 1 lb. and the coefficient of friction drops correspondingly to 1 As lubrication decreases, the coefficient of friction becomes more dependent upon the material of the surfaces.

For Brake and Clutch . . . Use Velvetouch



Velvetouch is *all metal*— a combination of powdered metals, compressed, sintered and welded to a solid steel backing plate.

Shots from the FIRING LINE

World's Largest Dragline Now Stripping Coal in Pennsylvania Field

A demonstration of the working of the largest dragline in the world were held October 18th and 19th at the Beechwood strippings of the Philadelphia and Reading Coal and Iron Company project by the Correale Construction Co. at Mount Laffee, near Pottsville, Pa.

This huge dragline, a Bucyrus-Erie 1150-B, has a 25-cu. yd. dragline bucket on a 180-foot boom which gives it the ability to dig 140 feet deep and dump 360 feet from where it digs. The machine weighs over 1,205 tons and is fitted with walking equipment.

A maximum depth of 300 feet will be excavated by the Correale Construction Co. on the Beechwood Project to expose the Mammoth Anthracite vein, which on this particular project has a thickness of about 100 feet. The vein pitches at an approximately 60° angle and the 1150-B will be used to make successive cuts varying from 120 to 140 feet in depth, spoiling the material on a downhill slope.

The Bucyrus-Erie dragline excavates the overburden and dumps it onto a spoil pile from where it will be rehandled by a secondary dragline, a Bucyrus-Monighan 15-W with 14-cu. yd. bucket. Not only do the draglines serve as digging tools, but also as transportation units, eliminating the necessity of hauling spoil material out of a cut which will eventually be 300 feet deep from the surface to the top of the coal.

The large machines were selected for high output on this project because the ratio of overburden to coal is approximately 3.8 to 1. The 1150-B operates 24 hours a day except for 15 minute shutdowns at the beginning of each shift for lubrication of parts that cannot be reached while the machine is in operation. This dragline has a maximum digging speed of about 250 feet per minute, this depending on the class of material being dug. With a loaded bucket it is capable of hoisting about 350 feet per minute.

The walking equipment of this Bucyrus-Erie dragline is composed of three major operating parts on each side of the revolving frame—cam, cam track, and shoe. Each cam has a diameter of six feet and the shoe dimensions are 8′ x 48′. The 1150-B can step off 7.5 feet at a time and has a walking speed of about 0.2 mph.

The dragline bucket weighs 62,500 pounds; is 13 feet high from teeth to top of arch; 11 feet 8 inches wide at the maximum outside dimensions, and is almost 17 feet long from the face of the arch to the rear of the bucket. To give greater strength, the entire front end was made as one unit with the lip and drag clevis assembly welded to the body. The body and arch plates are made of special alloy steels, and the multiple lug-drag-hitch assembly also is welded on for strength and lightness.

The base of Correale's 1150-B is 44 feet in outside diameter, and has a bearing area of 1,525 sq. ft. giving it a ground bearing pressure of 11 to 12 pounds per square inch when working. The rail circle has a diameter of 34 feet and there are 116 nine-inch rollers, forming in effect a huge roller bearing. For shipping purposes the base of the 1150-B was built in seven sections and it required about a ton of welding rod to erect it in the field.

The 1,900 sq. ft. deck area is composed of two frames, the main one which houses the operating machinery, and the sub-frame where the walking machinery shafts are located. The width and length of the upper machinery frame is approximately 29′ 6″ x 62′ 0″ with girders 50 inches deep. Depth of girders of the sub-frame is eight feet.

A projecting cab 23 feet above the ground gives the one operator necessary to control the entire machine a full unobstructed view of his work. The operator manipulates the swing machinery with his feet and the digging and hoisting machinery with his hands.

For the first time on a machine of this size three independent swing units are used, providing ample power for rapid acceleration and deceleration of the machine. Digging, hoisting and swinging are separately controlled by the operator. Each drum unit is a complete machinery assembly in itself, giving simplicity and smoothness since there is no clutching, no declutching and no operation of brakes when the big dragline is at work.

The 1150-B is equipped with the latest Ward-Leonard control, supplemented by Westinghouse's Rotorol, which speeds up the dragline's operating cycle giving faster response for digging, hoisting and swinging. The operating motors are heavy duty, shovel type motors, especially suited to the intermittent heavy duty of a dragline excavator. Two of them, 425 h.p. each, do the digging; two, 425 h.p. each, do the hoisting, and three motors, 125 h.p. each, are used for the swing. These D.C. motors obtain power from two motor generator sets driven by big A.C. motors have a combined rating of 1750 h.p. and take power from a 4000 volt transmission line.

The independent hoist and drag drum machinery units are designed to use twin ropes of two inch diameter for the hoist and twin ropes of 2½-inch diameter for the drag. This smaller diameter of ropes than could be used if a single rope were employed gives greater flexibility, and makes for easier handling in the replacement of worn ropes.

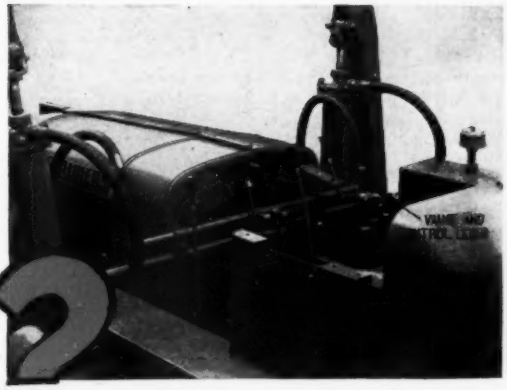
• Among the unique features of this Bucyrus-Erie 1150-B, the largest dragline in the world, are twin drag ropes and a self-straightening boom.

Highway Research Board Meeting Is Postponed

The Executive Committee of the Highway Research Board announced that owing to the exigencies due to the war it has been decided to postpone the Twenty-fourth Annual Meeting of the Board which had been scheduled to be held on November 22nd to 25th at the Netherland Plaza Hotel in Cincinnati, Ohio.

According to R. W. Crum, director of the board it is hoped that conditions

Ever Operate a BAKER?



If you did, we need not tell you how simple it is. We've been talking about direct hydraulic lift and full down pressure on the blade and about the ease and low cost of maintaining Baker bulldozers and gradebuilders. But, as a contractor who operates five Bakers pointed out to George Phares, our No. 1 field man—"Baker's ease of control is something to write home about."

Operator faces forward—no need to sit askew. Control lever is within convenient reach. Four lever positions—*float, down, hold, raise.* Fast, positive action. That *hold* is important—you can put the blade in a cut and hold it there! On many occasions, especially where the going is tough, hydraulic down pressure is the operator's "ace in the hole."

Baker Bulldozers on Allis-Chalmers 2-cycle diesel tractors are making it easier for our fighting forces on every front.

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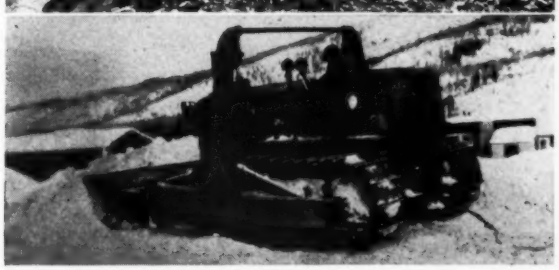

Top: Baker Bulldozer on Allis-Chalmers tractor clears floor of pit for buried fuel tank in South Pacific.
Bottom: Private Wally Saner, former Baker employee, removing snow at Alaska air base with Baker Gradebuilder which helped build base.

BULLDOZERS SNOW PLOWS **BAKER** CONSTRUCTION EQUIPMENT

may improve so that the meeting can be held early in 1945. It is expected, in any case, that the papers and reports scheduled for presentation at the meeting will be published in the annual volume of proceedings.

Maine's Postwar Program Amounts to $18,706,470

Maine's Highway Commission has proposed an $18,706,470 postwar road and bridge construction program, it was recently announced by State Postwar Planning Director Harry B. O'Brien.

O'Brien reported to the Maine Development Commission that the highway commission had been informed it has an unexpended balance of $10,239,000 in state and federal funds accumulated during wartime curtailment of highway construction because of labor and material shortages.

• Big 80-ton M-26 Tank Retriever salvaging a Mark-5 tank in France. This unit, built by the motor coach division of the Pacific Car and Foundry Company, is one of the largest pieces of automotive equipment used by the U. S. Army.

In addition to the highway commission's contemplated program, another proposed postwar highway project in Maine is a super streamlined two-way toll turnpike from Kittery to Fort Kent which would be financed by revenue bonds. The Maine Turnpike Authority has reported the first part of the proposed toll highway from Kittery to Portland would cost about $12,000,000. No estimate of the total cost has been announced, State Representative Joseph T. Sayward of Kennebunk, chairman of the authority, said a line survey between Kittery and Portland had been completed, with additional surveys in progress.

Maryland to Have $48,000,000 Plans Ready

Gov. Herbert R. O'Conor announced October 1st that there will be a sufficient number of public works projects ready for construction in Maryland in the first year after the war to provide 43,680,000 man-hours of employment, or the equivalent of the employment of 21,000 men for the period of a year.

His statement was based on a report of the Maryland Commission on Postwar Reconstruction and Development, in which it was stated that of a proposed total of $148,781,284 worth of construction, $48,000,000 will be ready for action in the first postwar year.

Basing its studies on the anticipation that all enemies of the United Nations will be defeated by July, 1946, the commission said in its report that "public works can make their greatest contribution from an employment standpoint if they can be started promptly and are not in competition for labor and materials with large-scale private construction that will get under way during the period of reconversion.

Although the commission anticipates that some public works will actually start after the war ends in Europe, it

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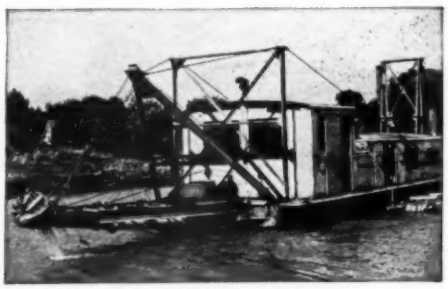
Complete integrated units, each designed for specific performance.

Bolted sectional steel hulls, power and pumping units, spuds, frames, ladder or booms are shipped by truck, rail and/or as hold cargo. May be easily assembled at inland site and dismantled for relocation after project is finished.

ASD dredges are backed by 40 years of dredge engineering and operating experience.



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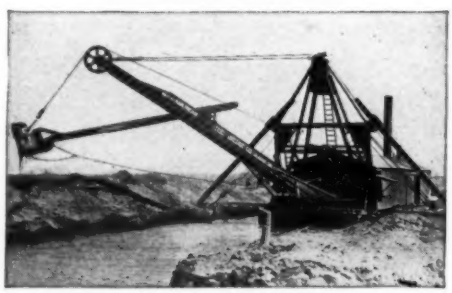

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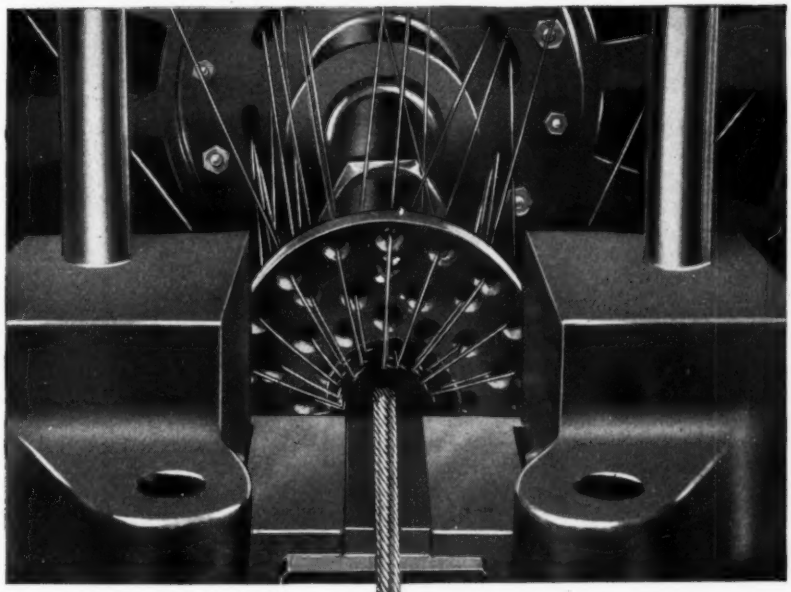
In Macwhyte PREformed Wire Rope, Internal Lubrication increases the life of the rope, thereby reducing operating costs.

A special-formula lubricant made to Macwhyte specifications is force-fed to the wires as they are being closed into the strand.

Macwhyte Internal Lubricant improves the sliding action of the wires as they move in bending around sheaves and drums. In many cases the inside wires are in good condition after the outside wires are seriously worn.

Operators of equipment prefer Macwhyte PREformed Wire Rope because it operates so smoothly and spools on the drum so well.



The above illustration shows how internal lubrication is applied to Macwhyte PREformed ropes. *(Top of stranding die is removed.)* Note the wires pass through the lubricant which is pumped up from below and therefore each wire is completely covered and all spaces between the wires in the strand completely filled.

Macwhyte Wire Rope Lubricant is packed around each wire in all strands of Macwhyte Wire Rope.

If you have a service problem, Macwhyte Wire Rope engineers stand ready to give you the benefit of their experience in selecting the proper size, grade, and construction.

The demands of our armed services are so great now, there may be times when we cannot give you our usual prompt service and delivery. The situation changes from day to day so please keep trying to get Macwhyte Wire Rope. We'll serve you if we possibly can.

Rope Conservation Bulletins

18 illustrated articles on the use and care of Wire Rope have been bound into an 8½" x 11" book which is available free to Wire Rope users requesting it on their company letterhead. Ask for Bulletins No. 43-85.

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based its report on the end of the war with Japan because of the uncertainty of available materials at any earlier date.

$1,350,000,000 Federal Aid Highway Bill Approved

In a last minute move before recess, the Senate passed the Hayden Postwar Highway Bill (S. 2105) carrying annual authorization of $450,000,000 for each of the three fiscal years following the war. Distribution of the authorization is made on the following basis: $200,000,000 for the Federal-aid system; $125,000,000 for secondary roads; and $125,000,000 for urban highways in areas having a population of 5,000 or more.

Refusing to accept any of the new formulas advanced, the Senate retained the initial Federal-aid formula with regard to funds for the Federal-aid system which is based on ⅓ area, ⅓ population and ⅓ road mileage. Secondary funds would be apportioned on substantially the same basis with the exception that rural population is used as a factor in lieu of total population. Urban funds are apportioned among the states in the ratio which the population in municipalities of 5,000 or more in each state bears to the total of such population for the United States.

Other changes in the Senate Bill as compared to the House Bill include: (1) The elimination of rights-of-way as an item of cost; (2) Changing the matching basis for the first fiscal year from 60 to 50 per cent; and (3) Requiring railroads to contribute not less than 15 per cent of the cost of grade-crossing projects.

The bill is now before the House Roads Committee which is expected to give it immediate consideration following the recess. There is no definite indication as to when final House action will be taken but Representative McCormack, Majority Leader, stated on the floor of the House just before recess that "it is the intention that the bill should be taken up after election day and before the termination of this session. There are certain provisions of the bill which have to be acted upon by the several state legislatures. It is an obligation and a duty and it is only right. So far as I am concerned I make the statement that the bill will be brought up after election."

Approximate Apportionment of Funds Under S2105 by States and Category of Improvement

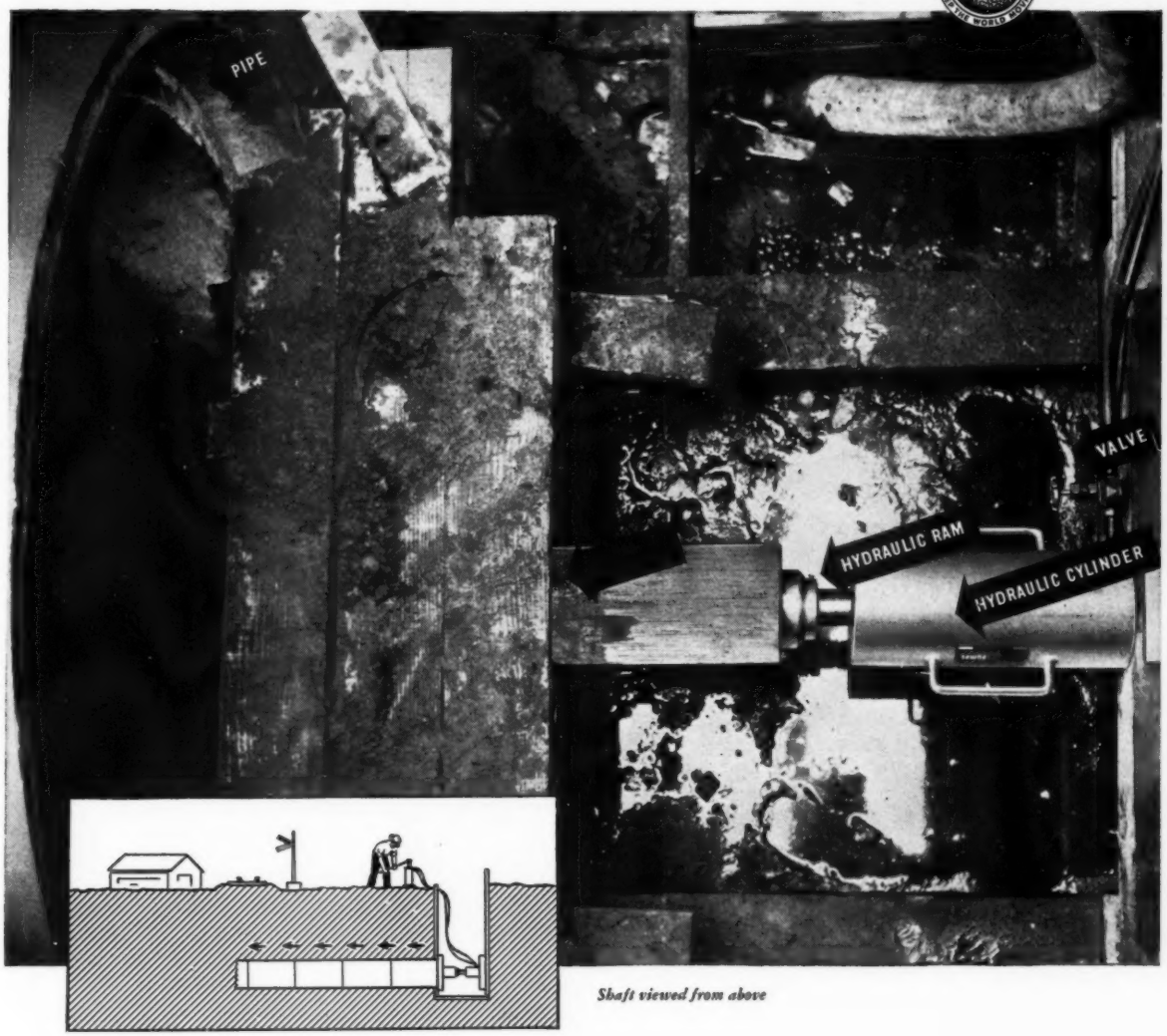
State	Federal-aid Highways	Secondary Roads	Urban Highways	Total
Alabama	$ 4,187,000	$ 3,109,000	$ 1,310,000	$ 8,606,000
Arizona	2,873,000	1,863,000	264,000	5,000,000
Arkansas	3,427,000	2,586,000	561,000	6,574,000
California	8,010,000	4,298,000	8,166,000	20,474,000
Colorado	3,593,000	2,267,000	939,000	6,799,000
Connecticut	1,241,000	639,000	1,985,000	3,865,000
Delaware	975,000	609,000	205,000	1,789,000
Florida	2,873,000	1,804,000	1,608,000	6,285,000
Georgia	5,020,000	3,591,000	1,631,000	10,242,000
Idaho	2,472,000	1,621,000	213,000	4,306,000
Illinois	7,874,000	3,974,000	9,562,000	21,410,000
Indiana	4,806,000	3,021,000	3,082,000	10,909,000
Iowa	4,962,000	3,325,000	1,601,000	9,888,000
Kansas	5,037,000	3,315,000	1,113,000	9,465,000
Kentucky	3,734,000	2,836,000	1,307,000	7,877,000
Louisiana	2,987,000	2,098,000	1,540,000	6,625,000
Maine	1,732,000	1,170,000	564,000	3,466,000
Maryland	1,628,000	976,000	1,800,000	4,404,000
Massachusetts	2,615,000	655,000	6,649,000	9,919,000
Michigan	6,076,000	3,446,000	5,713,000	15,235,000
Minnesota	5,381,000	3,475,000	2,218,000	11,070,000
Mississippi	3,591,000	2,778,000	603,000	6,970,000
Missouri	5,922,000	3,803,000	3,168,000	12,893,000
Montana	4,041,000	2,589,000	309,000	6,939,000
Nebraska	3,982,000	2,635,000	787,000	7,404,000
Nevada	2,551,000	1,602,000	61,000	4,214,000
New Hampshire	975,000	609,000	478,000	2,062,000
New Jersey	2,546,000	868,000	5,558,000	8,972,000
New Mexico	3,229,000	2,096,000	259,000	5,584,000
New York	9,636,000	3,563,000	18,878,000	32,077,000
North Carolina	4,822,000	3,706,000	1,501,000	10,029,000
North Dakota	2,982,000	2,014,000	216,000	5,212,000
Ohio	7,026,000	3,881,000	7,581,000	18,488,000
Oklahoma	4,517,000	3,109,000	1,356,000	8,982,000
Oregon	3,315,000	2,121,000	815,000	6,251,000
Pennsylvania	8,172,000	4,396,000	10,574,000	23,142,000
Rhode Island	975,000	609,000	1,129,000	2,713,000
South Carolina	2,709,000	2,098,000	658,000	5,465,000
South Dakota	3,139,000	2,095,000	223,000	5,457,000
Tennessee	4,237,000	3,056,000	1,602,000	8,895,000
Texas	12,666,000	8,364,000	4,488,000	25,518,000
Utah	2,250,000	1,405,000	436,000	4,091,000
Vermont	975,000	609,000	187,000	1,771,000
Virginia	3,656,000	2,659,000	1,499,000	7,814,000
Washington	3,148,000	1,988,000	1,475,000	6,621,000
West Virginia	2,196,000	1,732,000	812,000	4,740,000
Wisconsin	4,814,000	3,057,000	2,669,000	10,540,000
Wyoming	2,488,000	1,583,000	134,000	4,205,000
Hawaii	975,000	609,000	396,000	1,980,000
District of Columbia	975,000	609,000	1,153,000	2,737,000
Puerto Rico	987,000	944,000	839,000	2,770,000
Administration	5,000,000	3,125,000	3,125,000	11,250,000

Slate Production Decreases

Slate sold at quarries in the United States in 1943 amounted to 468,860 short tons valued at $4,870,237, accord-

a MAW-FULL'-every Load...
a 'MOUTHFUL' at Every Bite
Our landing craft, which have put hordes of fighting men and machines on enemy shores with incredible speed, have impressed the world with their efficiency.
Impressive too, is the efficiency with which Owen Buckets operate—taking capacity grabs of materials quickly—discharging them speedily—handling great yardage at low cost.
THE OWEN BUCKET CO.
6095 Breakwater Ave., Cleveland, O.
Branches: NEW YORK - CHICAGO - PHILADELPHIA - BERKELEY, CAL.
OWEN
BUCKETS

NO. 21 OF A "READY-WITH-A-RODGERS" SERIES



Shaft viewed from above

"DRIVING PIPE FOR THIS STORM SEWER WAS DUCK SOUP WITH OUR RODGERS UNIVERSAL"

"We had to go under a freight house and railroad tracks, pushing 6-foot concrete tile through sand for 40 feet. But our Rodgers Universal Press handled it slick as a whistle . . . at 1/10 of what it would have cost without your equipment.

"Headed by a steel bonnet, the tile was inched through without a hitch. And it was a big help to pump that 150-ton pressure from the surface, instead of a cramped space 16 feet underground."

This was reported by a Wisconsin municipality. The all-purpose Rodgers Universal Press saved them both time and money. It can do the same for you. For complete information and prices, write or wire Rodgers Hydraulic, Inc., Dept. B-11, St. Louis Park, Minneapolis 16, Minnesota.

If it's a Rodgers it's the Best in Hydraulics

Uses for the RODGERS UNIVERSAL HYDRAULIC PRESS
Gear Pulling • Wheel Press Work • Jacking Pipe • Erecting Machinery • Relocating Machinery • All-Purpose Jack

RODGERS HYDRAULIC, Inc.

• The Seabees use this Bucyrus-Erie 37-B 1½-cu. yd. shovel to load scoria (a cinder-like lava) to a four-wheel drive International Dump truck on a South Pacific island. The scoria is used to build airfield runway foundations.
Official U. S. Navy Photo

ing to figures compiled by the Bureau of Mines, United States Department of the Interior, from reports furnished by slate producers. This was a decrease of 21 per cent in quantity and 23 per cent in value compared with 1942—590,770 short tons valued at $6,360,223.

Roofing slate sold in 1943 amounted to 96,220 squares valued at $841,750. This represented a decrease of 50 per cent in quantity and 51 per cent in value compared with figures for 1942—192,070 squares valued at $1,704,053.

Sales in the Pennsylvania area (77,270 squares valued at $648,237) were 39 per cent lower in both quantity and value than in 1942. In the New York-Vermont area sales declined to very low levels. Roofing slate sold in Virginia in 1943 amounted to 11,900 squares valued at $122,932, a decrease of 43 per cent in quantity and 38 per cent in value.

Sales of mill stock, which includes all slate sold for structural and sanitary purposes, electrical use, blackboards, bulletin boards, school slates, billiard-table tops, and similar uses were 2,644,140 square feet valued at $938,368, a decrease of 18 per cent in quantity and 16 per cent in value from the 1942 output of 3,213,410 square feet valued at $1,112,426. Remarkable gains were registered in sales of grave vaults and covers and billiard-table tops, whereas all other uses of mill stock declined greatly.

Slate sold for flagging, cross-walks, stepping stones, and miscellaneous dimension slate amounted to 2,027,020 square feet valued at $166,231, a decrease of 19 per cent in quantity and an increase of 19 per cent in value compared with 1942.

Sales of crushed slate for roofing granules and flour, which amounted to 395,550 short tons valued at $2,923,888, decreased 18 per cent in quantity and 14 per cent in value compared with 1942.

New Jersey Highway Needs Total $521,770,000

New Jersey's state highway system needs improvements costing a total of $521,770,000, it was estimated by State Highway Commissioner Spencer Miller, Jr., in his annual report to Gov. Walter E. Edge and the State Legislature.

While federal funds are expected on a large scale to aid in financing post-war highway construction, observers pointed out that, in addition, it probably would be necessary for the state to sell a major bond issue and possibly increase the state gasoline tax to undertake any such far-reaching program as visualized by Commissioner Miller for a modern system of freeways or express highways and improvement of existing roads by widening and reconstruction.

Commissioner Miller said that the State Highway Department at present has plans for construction to cost $135,000,000 for more immediate needs.

Dump Trucks Important to South Pacific Campaign

Somewhere in New Guinea — Dump trucks are not among the most romantic weapons of war. Measured, however, against the contribution they make each day, all day, to the rolling back of the Japs, they rank high among the effective instruments America has forged to defeat the enemy.

The 198th Dump Truck Company is made up of 35 dump trucks and approximately 200 men to operate them, 24 hours a day, seven days a week. This Company has been in action for 17 months in the jungle fastnesses of New Guinea. The men know from the way they make periodic moves up the coast on the heels of the advancing infantry that their trucks, hauling gravel incessantly, make possible the roads, bridges, and airstrips over which our vast war effort is speeding—speeding because of those construction feats.

The 198th Dump Truck Company was organized two years ago at Fort Lewis, Washington. It has since been estab-

• International diesel tractor loads equipment into an LST for shipment to another location after a construction job is completed.
Official U. S. Marine Corps Photo

Above is a Sauerman Slackline Cableway cleaning loose rock out of a hydro-plant spillway and dumping the debris on a hillside well back from edge of stream. Some 40,000 cu. yd. was removed from the spillway in a few months at a cost far below the estimate.

This Sauerman Power Scraper (1 cu. yd. size) and portable crushing and screening plant has been producing 300 cu. yd. of graded material a day for a county road commission for 15 years.

CUT COSTS
in moving materials

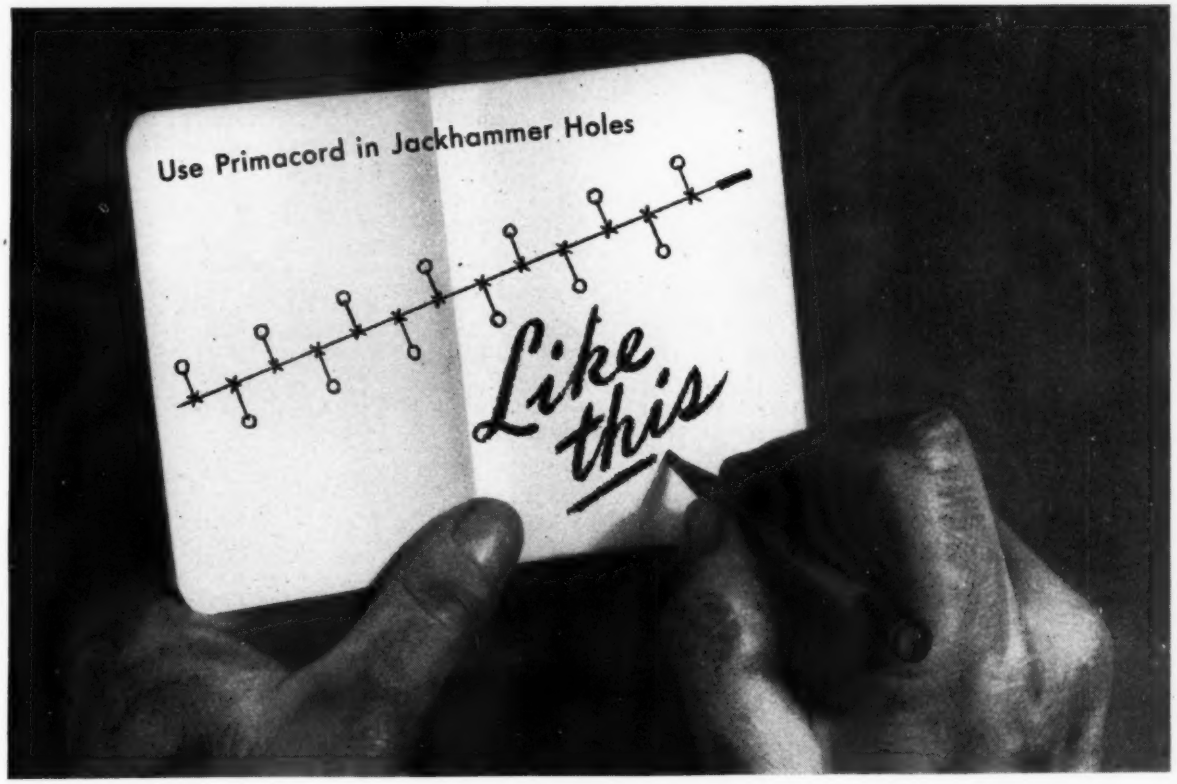
On jobs where materials are to be moved distances of several hundred feet or more, a SAUERMAN Drag Scraper or Cableway is in most cases a great money-saver.

First cost of a SAUERMAN machine is reasonable, maintenance expense is small, and the simplicity of operation permits easy one-man control of even the largest installation.

This equipment is very flexible and is readily adapted to meet new and difficult working conditions. Sizes range from small portable units designed for cheap handling of a small hourly tonnage of loose materials up to powerful machines that will move as much as 1,000 tons per hour of the toughest materials.

Write for catalog and see for yourself how others have cut costs on all kinds of dig-and-haul jobs with Sauerman Machines.

SAUERMAN BROS, INC.
574 S. CLINTON ST. CHICAGO 7, ILLINOIS



PRIMACORD for Small Holes

pays off in several ways

FIRST: The use of this insensitive detonating fuse reduces the hazards of loading and firing.

SECOND: Priming and loading each hole with Primacord is easier and quicker than any other method — saves time and labor.

THIRD: The fact that Primacord detonates every cartridge in every hole, means that each cartridge "goes" with the extra force of a primer cartridge. You get more work from your explosives.

Primacord is light in weight, flexible, strong — easily handled by one man. It cannot be set off by ordinary shock, friction or stray electric currents — and must be detonated. Because of its many advantages, operators are finding it profitable to use Primacord *throughout* the quarry.

23

PRIMACORD-BICKFORD
Detonating Fuse
Manufacturers of Safety Fuse since 1836

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT

lishing records of performance that have won for the Company the commendations of Service Force commanding officers and Chief Engineers.

The unit has maintained a record of 90,000 miles of hauling a month, with the vehicles being worked in three shifts around the clock daily. This has been accomplished over every type of road and trail, and all while the Company was making its own repairs and maintenance to keep the trucks in regular daily duty.

The 198th is headed by 1st Lt. Carl C. Hauser, Aurora, Illinois, who, like practically every man in the organization, has been with the Company since the day it was formed. It landed soon after the securing of beachheads and put its trucks into action soon after reaching shore.

With 4½ and 2½-ton trucks in operation the equivalent of many mountains have been moved about the New Guinea territory since the organization first landed at Milne Bay in February, 1943. Often schedules have been pushed through sniper-infested country, and many of the vehicles carry bullet holes as mute witness to the close calls the men have had.

American Highway Mileage

The American Association of State Highway Officials reports a total of 2,980,823 miles of roads in the United States on January 1, 1944. Of this total, 442,543 miles are classed as improved roads and 480,352 miles are on state highway systems.

Permit Gold Mining Firms To Prepare for Re-opening

In preparation for "X" Day the War Production Board has established a policy to permit gold mining firms to obtain such materials and equipment as will enable them to rehabilitate properties and machinery and make the mines available for immediate operation when WPB revokes Order L-208, it was announced.

Equipment covered by Priorities Regulation No. 24, which permits placement of orders now for capital goods needed after the war, may be obtained by making application to WPB field offices. If preference ratings are needed to obtain other equipment and materials, application should be made to the Mining Division, War Production Board, Washington 25, D. C.

WPB officials emphasize that this procedure does not authorize the reopening of gold mines for the production or milling of ore, but is intended to permit operators, who have manpower now employed by authorization under L-208, to put mines and equipment in shape preparatory to reopening the properties.

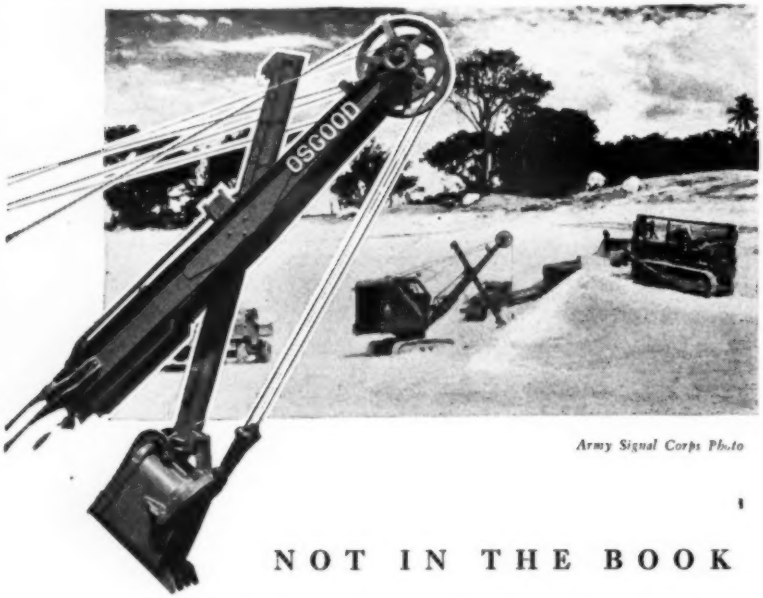
Plans Set for Disposal of Used Construction Equipment

Surplus Property Division of Treasury Procurement has set up the procedure for disposing of used construction machinery. It instructs Regional Directors, Chiefs, Property Utilization Divisions to carefully examine each piece of surplus construction equipment. A detailed description is to be given each piece including such items as—make, model, and serial number; capacities, type of power, and other pertinent information.

The regional offices are further instructed to first offer equipment to Federal Agencies, then to the tax-supported agencies. To the extent practicable, negotiated sales should be made based on the recommendations of the Public Roads Administration. Circulars should be directed only to those Federal and Tax-supported agencies who are likely to be interested.

Sales must conform to OPA Maximum Price Regulations. As far as possible machinery is to be sold to dealers. The description given for a "dealer" is: "a person or firm engaged in the business of buying, selling, and repairing or reconditioning of such machines."

The regional offices are instructed to make every effort to assure that each piece of equipment sold will be put to the best possible use. Each piece of equipment is to be sold individually unless authorization to sell on a lot basis has been received from the Central Office. All bidders are required to execute the following certificate which



Army Signal Corps Photo

NOT IN THE BOOK

. . . But All In the Day's Work

Red coral of tropical islands wasn't given much consideration when the "daddy" of this OSGOOD shovel was designed.

Yet today dependable OSGOOD "20's" are perfectly at home, excavating road and runway material from rock-hard coral pits of South Pacific Islands and otherwise doing their part along the "trail to Tokyo."

Such "digging ability" is typical of daily OSGOOD performance under *all* conditions (often under enemy fire) from the tropics to the tundras. It is evidence of the power, stamina, and versatile OSGOOD efficiency that peace will divert to *your* requirements.

THE GENERAL EXCAVATOR COMPANY
CRANES, DRAGLINES AND SHOVELS
DIESEL, GAS, ELECTRIC

Associated with The General Excavator Company
OSGOOD
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OSGOOD
SHOVELS, DRAGLINES CRANES
CRAWLER & WHEEL MOUNTS
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CUT COSTS on ALL Lengths of Haul

Time saved in loading . . . on the haul road . . . and on the dump or fill . . . means more round trips per hour and more yards or tons moved per day. Rear-Dump and Bottom-Dump EUCLIDS are engineered for off-the-highway service and are economical on both short and long hauls.

Fast, easy loading by modern excavating equipment, coupled with Euclid speed and efficiency on the haul road, is the surest way to cut your hauling costs on all types of jobs. Your Euclid distributor or representative is at your service to provide information and to help with plans for your present or post-war hauling equipment.

A new pictorial booklet "Bottom-Dump EUCLIDS On The Move" is yours for the asking. Write for your copy of this interesting booklet today.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH ROCK COAL ORE

is made a part of the Invitation and Bid:

"It is hereby certified by and on behalf of the Bidder that the Bidder is engaged, in whole or in part, in the business of buying, selling, and repairing or reconditioning construction or farm machinery, and maintains a place of business for the display, sale, and repairing or reconditioning of such machinery. The aforementioned business is not maintained for the primary purpose of purchasing such vehicles for scrap, or in order to salvage usable parts for resale."

If no bids are received under the above outlined procedure the machines may be offered to the public.

Need Landing Facilities For Postwar Flying

Expansion of private airplane operation after the war will require the development of adequate landing facilities for private flying in cities and towns throughout the country, it was emphasized by Joseph Geuting, Jr., chairman of the Personal Aircraft Council of the national Aeronautical Chamber of Commerce, in a recent address in New York.

Some 3,000 regular landing fields, he said, will have to be augmented by simpler facilities, such as "airparks," "air harbors" and "flight stops" to meet the needs of private flyers.

Geuting, who announced the Aeronautical Chamber's publication of a booklet entitled "Put Your Town on the Air Map," said that airparks can be built with two strips 2,000 feet long by 300 feet wide for $25,000 up, according to the amount of grading required. They can be worked in with tennis courts, playing fields or other recreational or revenue-producing features, he added.

Air harbors were described by the speaker as consisting of similarly simple facilities, perhaps only a ramp and a hangar, beside a quiet waterway for the accommodation of waterborne craft.

Flight stops, or intermediary landing areas between cities, should be built by state and county highway departments, according to Geuting. He described the flight stop as a 2,000 foot by 300 foot landing strip, or two of them, alongside a highway with only gassing facilities for airplanes.

Copper Requirements

Refined copper requirements should be approximately 379,000 tons per quarter after Germany's defeat, the Copper Producers' Industry Advisory Committee heard at a recent meeting, the War Production Board announced.

Military and essential civilian uses should consume 281,000 tons, and civilian uses 98,000 tons, Government officials indicated. The need for maximum copper production for war needs was stressed, however, as being of paramount importance until victory is won in Europe.

Excess Equipment Seen As Postwar Problem

The thousands and thousands of new pieces of major construction equipment which will be in the nation's huge stock pile of war surpluses constitutes one of the most pressing postwar problems, according to a bulletin issued by the American Road Builders' Association. In addition, vast quantities of used equipment will be ready for disposal.

"While at present it is impossible to obtain accurate estimates of construction equipment surpluses, it is known that very large quantities will be on hand in this country when the war ends, at the factories, in transit, at Army and Navy bases and at docks waiting for shipment," explained E. R. Galvin, president, Manufacturers Division of the Association and president Tyson Bearing Corporation. "More than 100,000 pieces, exclusive of trucks, were produced in 1943 alone.

"Construction equipment manufacturers, like all other industries, have performed miracles during the war. Today, construction equipment is being made at two to ten times the normal peacetime production.

"Obviously one of the fundamental approaches to this problem is that of placing construction equipment at work on urgently needed projects of all

GATKE
BRAKE BLOCKS
are
Custom-Built

for all Trucks, Tractors, Trailers, Buses and Heavy Duty Axles.

On fleets of all kinds from coast to coast GATKE *CUSTOM-BILT* Brake Linings contribute to *safe, dependable operation* and reduced maintenance.

The smooth, *non-grabbing* action adds *countless* miles to tire life. Fewer adjustments and replacements *save precious maintenance hours.* Proper balance between shoes gives *maximum holding power.* Constant holding power at all operating temperatures with no letdown under prolonged use.

Comparison Proves. Use GATKE *CUSTOM-BILT* Brake Lining for your next 5 relines and *compare results with the best you have ever had.*

Ask your GATKE Jobber for particulars.

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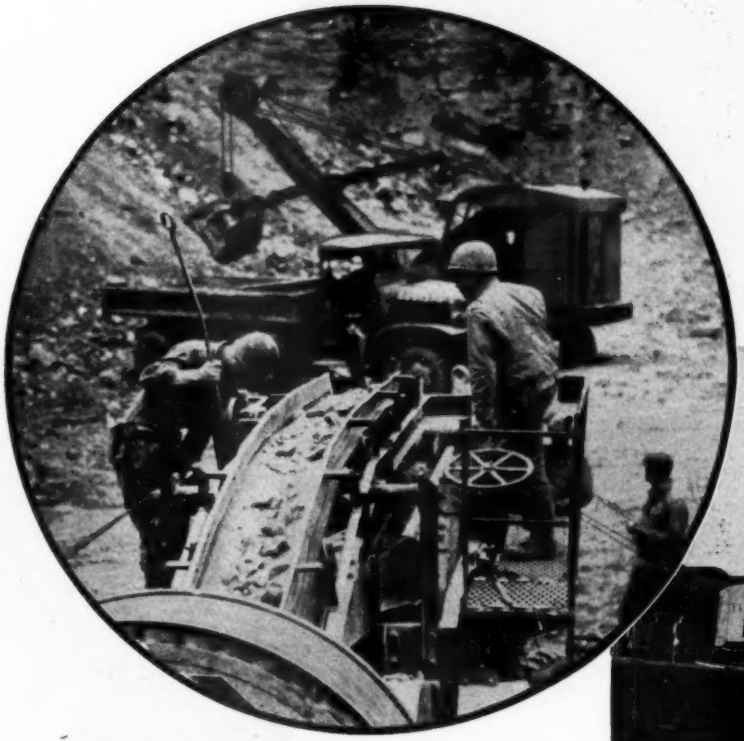
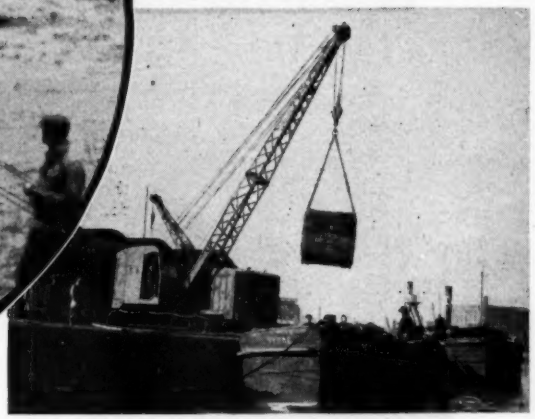
BLOCKS SETS ROLLS SHEETS
GATKE CORPORATION 228 N. La Salle Chicago 1, Ill

TOTAL WAR – ALLIED VERSION



FRANCE — A 15-B shovel loads rock for a crusher.
(Signal Corps Photo)



ENGLAND — A 22-B crane unloads rations.
(Signal Corps Photo)

SICILY — A 15-B crane unloads landing mats
(Signal Corps Photo)

SOUTHWEST PACIFIC — A 37-B shovel supplies trucks with aggregate. *(Official Navy Photo)*

Fine excavating equipment in the hands of skilled men — the weapon the Axis overlooked — is one of the distinguishing marks of total war, Allied version.

Leaders always, Bucyrus-Eries on all the fighting fronts are adding to the effectiveness of Allied total war. And their outstanding features of design and workmanship will put Bucyrus-Eries in the front ranks of tomorrow's reconstruction.

V-69C

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

kinds. Authoritative studies of postwar employment conditions place the surplus of labor over jobs at upwards of nine million. With equipment at hand and with workers available, both private and public construction should be given every encouragement.

"In highway construction alone, urgent needs are faced which in being met can absorb much of the equipment and manpower available. Surveys conducted by this Association have shown that road and street needs for the next several years total in the neighborhood of 16 billion dollars. Of that amount, urgently needed construction, to replace the deficiencies which developed during the depression and during the war, will total at least 10 billion dollars.

"By no means should construction be planned which is not actually needed. Made work of the WPA category and non-essential projects created to make jobs would be as wasteful as dumping tractors and trucks into the sea. Fortunately, there are plenty of needed projects not only for the safety and convenience of traffic, but to meet industrial, housing, sanitary and many other needs both private and public," said Galvin.

Postwar Public Works Plans Need to be Expedited

Plans for postwar public works projects by state and local governments needs to be expedited, if they are to have any particular effect on employment and business conditions in the period of transition from war to peacetime, H. E. Foreman, managing director of The Associated General Contractors of America, the national trade association of leading construction firms, declared today.

Results of the survey made by the Federal Works Agency for the House Committee on Post-War Economic Policy and Planning, Foreman pointed out, show that the plans of state and local governments in the completed stage total $969,858,000 as compared to a total of $1,749,242,000 in the design stage, $3,701,884,000 in the preliminary stage, and $6,297,387,000 in the idea stage.

"More of these plans need to be brought to the completed stage," he said, "because it usually takes longer to bring such projects to the start-work stage than it does to build them."

Local Committees for Economic Development, chambers of commerce and other local groups are developing well-planned programs in many communities, he stated, "but there is an urgent need for the Federal Government to establish a definite policy with respect to assistance to state and local governments in the planning and construction of their public works. The lack of such a policy is undoubtedly causing local governments to delay their planning of needed projects.

"There is also a need for a prompt definition by Congress of the field of public works after the war," he added, "so that private enterprise could know in which fields it would be free to function and in which fields it could expect government competition."

In an active economy, he explained, private construction usually accounts for two-thirds of the total construction, and private enterprise furnishes the largest part of employment.

Mr. Foreman said the A.G.C. had made a careful study of the results of the FWA survey, and he released the following tabulations which his organization had made of the data to show the need for the completion of more plans:

Ask Ban on Indiana Highway Diversion

An Indiana state constitutional amendment banning highway fund diversion was advocated in a resolution adopted by the Indiana Highway Users' Conference at a meeting September 14th in Indianapolis.

Leland K. Fishback, conference secretary, said that although diversion was stopped by 1943 legislation, constitutional amendment is necessary to prevent future misuse of automotive tax revenues.

The conference also went on record as opposing the use of highway funds in future construction of aviation landing strips throughout the state. Such developments should be financed from landing fees, service fees and aviation gasoline taxes, it was contended.

Consider Postwar Plans for Florida Highway

Responding to a call from Judge Robert R. Dewell of Haines City, Fla., president of the Scenic Highlanders Association, more than 70 civic, business, and political leaders gathered in Silver Springs, Fla., recently to consolidate plans for a super-highway system in Florida to be built around Route

United States Summary of Estimated Cost of Public Works by Type of Project

(Amounts in thousands)

Type of Project	Completed Stage	Design Stage	Preliminary Stage	Idea Stage
Highways, roads and streets	$176,243	$ 351,776	$ 786,439	$1,392,036
Bridges, viaducts and grade separations	92,152	119,526	319,989	427,710
Airports, terminals and landing strips	28,296	60,962	151,172	270,095
Sewer, water, and sanitation facilities	258,079	463,406	860,341	1,277,120
Schools and other educational facilities	110,027	218,148	355,783	627,346
Hospitals and health facilities	57,118	91,829	176,069	291,156
Public buildings	54,090	73,720	208,204	669,859
Parks and other recreational facilities	49,577	73,866	185,149	418,593
Miscellaneous public facilities	144,276	296,009	658,738	923,472
TOTALS	$969,858	$1,749,242	$3,701,884	$6,297,387

on ROGERS TRAILERS

TODAY even airplanes "bum a ride" on ROGERS TRAILERS. Deck houses for Victory ships . . . huge coastal defense guns . . . giant tanks, all are speeded towards completion and rushed to the fighting fronts on ROGERS TRAILERS.

In War and in Peace ROGERS TRAILERS have proven their ability to "deliver the goods". New models which will be available when war contracts are completed will be even better-engineered . . more efficient than the thousands which have been used successfully by industry for many years.

ROGERS BROS. CORPORATION
ALBION,
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EXPERIENCE builds 'em
PERFORMANCE sells 'em

NEW *Sheppard* Installation in Strip Mine

Pioneers NEW Use for Diesel Power

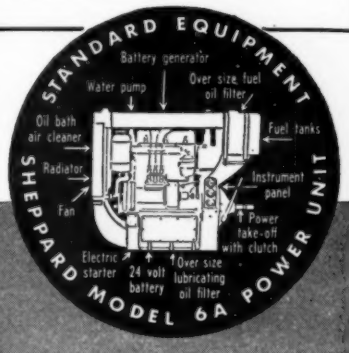
THE Dye Coal Company of Cadiz, Ohio, has just installed a Model 6A Sheppard Diesel as the prime generator of power for maintenance equipment. This is a new use for a Diesel . . . and it points the way to improved operation and substantial power economies in similar installations.

The Sheppard Diesel used by the Dye Coal Company is a Model 6A direct-connected . . . by means of a double engagement flexible coupling . . . to an 18.7 KVA—AC 120/240 volt, 1200 R.P.M. generator. This unit is mounted on a steel beam base and is equipped with an automatic starting control.

The Dye Coal Company will use this Sheppard Diesel to generate light and provide power for operating drill presses, grinders and other small tools in the field repair shop; for repair and maintenance of power shovels, bulldozers, trucks and other equipment for stripping operations. On priority, Sheppard Diesels are available NOW to essential industries. Sheppard Diesels for post-war use in all industries may be "reserved" through the Sheppard Post-Priority Plan. Before buying any Diesel or a substitute power source, check on the availability of Sheppards.

Free Bulletin—JUST PUBLISHED—
Shows Sheppard Pump Applications

Sheppard Diesels are standard equipment on the pumps of many nationally known manufacturers. Sheppard also supplies complete pump units. Learn how Sheppard performance is cutting pumping costs . . . increasing pump output . . . in diversified industries. Write today for free Sheppard pump bulletin . . . just published.



R. H. SHEPPARD COMPANY, HANOVER, PA.

Sheppard

ALL AMERICAN DIESELS

19, through the center of the state. Representatives of Federal Route 19 Association and the Orange Blossom Trail, all interested in better roads for Florida people, were present.

The meeting was primarily intended to consider postwar plans for Route 19, a military highway to run through the center of the state, with tributary highways to important coastal points.

Distribution of Mining Machinery Produced in 1944

The value of mining machinery and repair parts produced in the United States during the first six months of 1944 was $71,300,000, or 98.3 per cent of the production rate for the year 1943, in which year the production was $145,100,000—the Mining Division, War Production Board, announced. Of the 1943 production, 87.2 per cent was shipped to domestic users, while 12.8 per cent, including 2.7 per cent to Canada, was shipped to foreign countries. The shipment rate for the first six months of 1944, as compared with the year 1943, showed an increase of one per cent to domestic users and a corresponding decrease to foreign countries. Data presented in this release are obtained from informational reports received from all manufacturers under the direction of the Mining Division and represents substantially all of this type of equipment produced during the periods covered.

Mining machinery, for the purposes of this release, is divided into two groups: (1) Underground Machinery and (2) Other Machinery commonly used in mining. The Underground Machinery group comprises mine type locomotives, shuttle cars and mine cars; coal cutters; underground portable conveyors; mine hoists; electric coal drills and core drills; mobile coal loaders; various types of rock and ore loaders designed for underground use, such as slushers and shovels; and a miscellany of other specialized equipment. The Other Machinery group is composed of mine type crushing and grinding machinery; equipment which is primary to the concentrating, classifying and conditioning of ores, minerals, and coal; and equipment which is primary to the smelting and refining of non-ferrous ores.

• When a jungle is cleared and the rough grading finished, sheepsfoot rollers, pulled in tandem by an International diesel tractor, pack the earth for the planes.
Official U. S. Navy Photo

Elect D. W. Winkelman Syracuse Bank Director

Dwight W. Winkelman, public works contractor and owner of D. W. Winkelman Company, was elected a director of Lincoln National Bank & Trust Company of Syracuse at a meeting of the board of directors in October.

During the past few years D. W. Winkelman Company has handled many large contracts including the Syracuse Army Air Base, the Watertown Air Base, the Army Airport at Glens Falls and extensive work in Tennessee, Virginia and New Jersey. At present his firm is engaged in the construction of air bases at Natchez, Mississippi and New Orleans, Louisiana.

Mr. Winkelman has served two terms as president of the New York State Highway Chapter of Associated General Contractors of America, Inc. At present he is chairman of the Highway Division of Associated General Contractors of America, Inc., is a member of the Construction Industry Advisory Group of the Chamber of Commerce of the United States and is also a member of the Construction Industry Advisory Group of the War Production Board.

Oregon Highways in Good Condition

The highway system of Oregon is in excellent shape, according to R. H. Baldock, state highway engineer, who recently returned from a 1,500-mile inspection tour. Only two per cent of the roads covered were reported to be in below average condition.

Almost $18 Billion Spent on Roads and Streets in Decade

Total street and highway construction and maintenance expenditures for the 10-year period, 1933-42, amounted to $17,754,000,000, according to the United States Public Roads Administration.

Construction costs totaled $8,190,000,000, with the Federal Government

DIGGING BUCKETS...with the heaviest digging bucket jaws in standard use...with closing ratios up to 7:1...do handle yardage faster, throughout each year of a long life.
Bucket, you sure dig a mouthful!
HAISS
HI-POWER
GEORGE HAISS MANUFACTURING CO., INC., 144th St. & Park Ave., New York 51, N. Y.
Bucket agencies throughout the country. Write, wire for prices, delivery and catalogs.

A STEEL SETTER'S DREAM

THE Northwest Model 71—big, powerful—40 tons capacity—yet easily maneuvered to any part of the job—and it loads itself on one flat car. Unusual versatility is made possible by various drum and boom hoist combinations that will take care of any steel handling job.

The Model 71 can be equipped with either two or three live drums in addition to the Independent High Speed Boom Hoist. A flange connected boom in conjuntion with the Boom Hoist Bridle and Pendant Lines make boom length changes easy without rereeving cables. A Hammer Head boom permits higher lifts without fouling the boom.

Smooth easy control is provided by the Northwest "feather-touch" clutch control, another Northwest exclusive feature. The "feather-touch" control makes possible the throwing of the heavy drum clutches by the power of the engine. Fractional inch moves are possible and the feel of the load is always present.

Here is a crane you should be familiar with for those postwar steel erection and heavy lifting jobs.

NORTHWEST ENGINEERING COMPANY
1750 Steger Building
28 E. Jackson Boulevard, Chicago 4, Illinois

NORTHWEST

The Crane that goes Anywhere!

supplying $2,160,000,000, the states $3,030,000,000 and $3,000,000,000 spent by counties, cities and towns.

Maintenance costs of roads and streets for the decade amounted to $5,365,000,000 with the states spending $1,931,000,000; counties, cities and towns $3,434,000,000 and Federal Work Relief $4,199,000,000.

Expenditures by years on street and highway construction and maintenance by all agencies were:

1933—$1,110,000,000
1934—$1,554,000,000
1935—$1,290,000,000
1936—$2,022,000,000
1937—$1,824,000,000
1938—$2,177,000,000
1939—$2,173,000,000
1940—$2,110,000,000
1941—$2,026,000,000
1942—$1,468,000,000

180,000 Miles of Roads in Britain

England's system of highways, which has been in the process of construction and improvement for 2,000 years, totals approximately 180,000 miles. Trunk highways and Class I roads amount to about 15 per cent of the total; Class II roads 10 per cent, and the remaining unclassified 75 per cent is comprised of residential streets and country lanes. Most of England's roads and streets have all-weather surfaces.

Double Shovel Shipments in Second Quarter 1944

Twice as many tractor-mounted cranes and shovels were shipped in the second quarter of 1944 as in the corresponding quarter of 1943, the War Production Board reported.

Second quarter shipments of angle-dozers and bulldozers and of power cranes and shovels were 55 per cent and 47 per cent greater, respectively, than shipments of these items in the second quarter of 1943.

Comparative data released today by WPB on shipments and unfilled orders for 13 items of construction machinery follow:

(Number of Machines)

PRODUCT	Shipments Second Qtr. 1944	Shipments Second Qtr. 1943	Unfilled Orders End of 2nd Qtr. 1944	Unfilled Orders End of 2nd Qtr. 1943	No. Companies Reporting
Graders	1,530	1,450	4,536	3,897	9
Bullgraders and Bulldozers	6,104	3,930	21,134	11,290	18
Cranes and Shovels, Power	2,525	1,723	—	—	22
Road Rollers	745	770	2,917	1,954	10
Hauling Scrapers	1,117	1,497	—	—	12
Contractors' Concrete Mixers	846	778	2,800	—	9
Concrete Mix-Agitators, Truck Mtd.	66	49	—	—	6
Contractors' Pumps	11,144	10,230	44,676	17,183	17
Bituminous Heating Kettles	904	835	—	—	13
Tractor Mtd. Cranes and Shovels	2,514	1,255	6,862	4,345	28
Snow Plows	379	132	456	2,781	25
Trenching Machines	160	156	1,421	—	5
Street Sweepers	301	541	484	1,122	10

In each case, the number of companies reporting represent approximately 100 per cent of the industry, WPB said.

Plan $150,000,000 Flood Control Work in Kansas

An ultimate expenditure of $150,000,000 is contemplated for flood control projects for Kansas streams which are in the construction and planning stages, according to recent announcement in Topeka by J. C. Mohler, secretary of the State Board of Agriculture, and George S. Knapp, engineer for the Division of Water Resources.

It was noted that for the Kaw river basin the Kanapolis dam on the Smoky Hill was approximately 60 per cent completed and could be put into operation in a short time. The project was halted by the war emergency, after completion of the control works and a part of the dam. The dam must be

WELLMAN WILLIAMS TYPE BUCKETS

Dig Deep and Bite Clean

Wellman Buckets, in Power Arm and Multiple Rope Types develop great digging power. They bite into frozen ground, hard clay or shale, and come up with full loads.

WELDED ROLLED STEEL CONSTRUCTION FOR GREATER STRENGTH AND LONGER LIFE

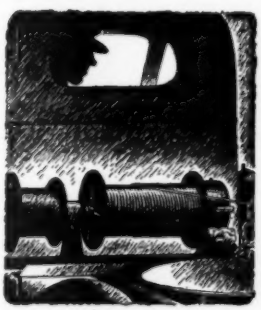
Welded design which made Wellman Buckets so universally preferred for heavy duty in steel plants and dredging, is now featured in all Wellman-Williams Clamshell and Dragline Buckets—⅜ to 16½ yd. capacities.

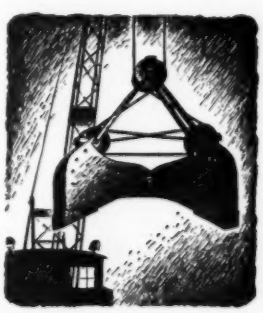
SEND FOR FREE BULLETIN

Tell us about your particular requirement and we will send full description of construction and features in special bulletins which clearly proves why YOUR NEXT BUCKET SHOULD BE A WELLMAN.

THE WELLMAN ENGINEERING COMPANY
7002 Central Avenue • Cleveland 4, Ohio
Sales and Service Agencies in principal cities

Why
B-E-T-H-L-E-H-E-M F-O-R-M - S-E-T
spells
E-C-O-N-O-M-Y





One of the greatest advantages of Form-Set (Bethlehem's preformed rope) is an inherent "bendability" that makes it ideal for use with small sheaves and drums, and where sharp reverse bends are necessary. As the preforming operation greatly reduces internal stresses and strains, Form-Set rope will naturally last longer—and do the job better—where highest resistance to bending fatique is required.

Increased rope life naturally means a saving of overhead. There's a cash value, therefore, in every extra day of Form-Set's life.

And that's not the only saving. The longer your ropes remain in service, the less your machines are "down" for rigging . . . the less productive time you lose.

These are a few of the solid reasons why Form-Set means overall economy in such a wide range of industries—industries that use power shovels, cranes, derricks, overhead air and electric hoists, and many other types of machinery.

Bethlehem makes wire rope in all standard grades and constructions, any of which can be supplied with the Form-Set feature. In addition, we maintain a staff of engineers whose business it is to work closely with you on wire-rope problems.

When you think WIRE ROPE
. . . think BETHLEHEM

KOEHRING COMPANY • MILWAUKEE 10, WISCONSIN

New Half-Yard KOEHRING 205

has many new features for cost-cutting operation

Two-In-One Shovel Boom • Trigger Fast Dipper Trip • Clear Interior Turntable • Independent Traction • Spacious Walk-Around Area • Exceptionally Accessable Machinery • Head Room in All Parts of Cab • Easily Removable Machinery Units • Two Purpose Main Machinery Support • Exceptional Steadiness • Instant Travel Reverse.

KOEHRING HEAVY DUTY

ARMY E NAVY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

• A sandy-mud soil plus daily rain storms gave this type of road to Marines during their first days of operation on Bougainville. Jeeps and trucks were unable to get through to the front lines with food and ammunition and so tractors with caterpillar mounted trailers were used until engineers and Seabees could surface the roads with coral from the sea.
Official U. S. Marine Corps Photo

finished and the lake bed cleaned before final filling of the present channel can get under way.

Construction of a double purpose dam on the Republican river, the longest and most troublesome of the Kaw tributaries, in Harlan County, Nebraska, has been authorized by Congress. Authorization also has been given by Congress for the making of plans for a huge reservoir on the Blue river.

Also of Kansas interest is the expectation that the Caddoa dam in Colorado, when completed, will have an important bearing on Arkansas river floods and also may be helpful in supplying a minor part of the water for irrigation purposes.

Four flood control reservoirs are to be located on the Verdigris and its tributaries in Kansas. Two are on the Verdigris, one at Toronto and the other at Neodesha, while the third is on the Fall river west of Neodesha, and the fourth on the Elk river below Elk City. A reservoir on the Caney river at the Kansas state line will be known as the Hulah reservoir.

"We expect," Mohler announced, "similar authorization will be made by Congress for at least three major reservoirs in the Neosho river basin. Studies as to the Marias des Cygnes basin so far have not resulted in recommendation of any reservoir projects. Further study and examination may reveal feasible sites for effective storage units in this area.

"For the western part of the state, consideration is being given to the development of available water supplies for irrigation. Proposed projects in various stages of planning include lands along the south fork of the Republic river, Prairie Dog and Sappa creeks and along the Republican, Solomon, Saline, Smoky Hill and Cimarron rivers. These projects provide water for the irrigation of 150,000 to 200,000 acres of land.

"The whole program of prospective water resources development in Kansas includes the construction of works estimated to cost some $150,000,000. Plans for various units are being completed and will be available so that projects may be built as rapidly as possible to accommodate the economic expansion of industry and stabilization of agriculture or as may be needed to provide employment after the war through a program of construction of useful public works."

Peruvian Road Saves Huge Mileage

Completion of Peru's ocean-to-Amazon highway makes possible the trip from Lima to Iquitos in five days—two by motor car on this highway and three by river steamer. Previous to the completion of this 522-mile highway, the 30-day overland trip by mule and by canoes between these two cities was so arduous that many travelers preferred to go the long way 'round by steamer — up to the Panama Canal, around northern South America to the mouth of the Amazon and up the Amazon to Iquitos, a total distance of over 5,000 miles.

Plan to Cut 3,000 Tons of Peat in New Hampshire

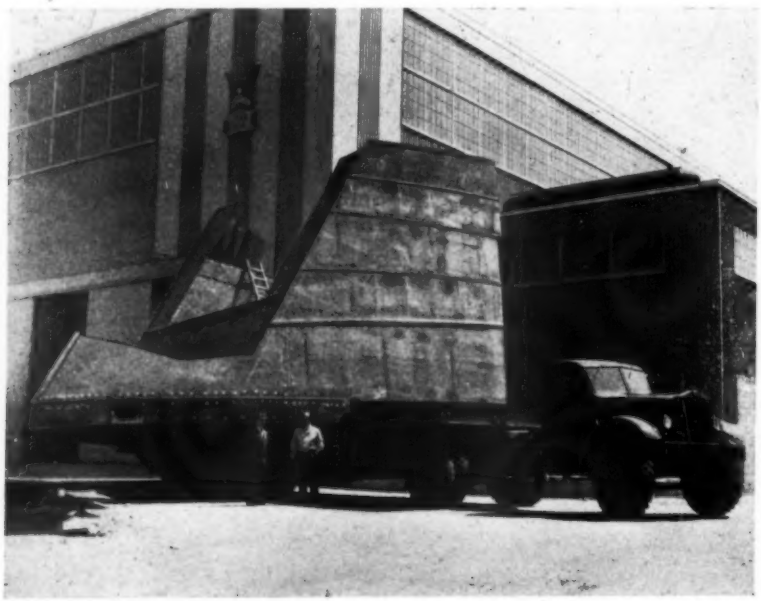
Three thousand tons of peat fuel will be cut in the town of Amherst, N. H., and shipped out this year, in a project sponsored by Professor F. H. Crabtree of Tufts College, Medford, Mass., who has made a study of peat bogs scattered throughout New England, and the use of peat as fuel.

The bog that will provide this fuel covers 100 acres. The deposit and its value was recognized some years ago, and since then studies have been devoted to means of harvesting the peat and preparing it for market.

The peat is ground up and moulded into blocks which are then placed on sandy soil for drying. Through drying the peat becomes featherweight and can be used for small industrial heating plants and it is particularly desirable for fireplaces. The Amherst bog is expected ultimately to yield 300,000 tons. There are some millions more tons in Maine peat bogs and considerable quantities in Massachusetts, none of it exploited as yet.

Alaskan Cut-Off Road Abandoned

The Hains "cut-off" road built to relieve traffic congestion on White Pass and Yukon Railway between Hains, Alaska, and White Horse, Yukon Territory, is being abandoned as an artery of traffic according to headquarters of Northwest Service Command in Edmonton. Construction was carried out by the U. S. Public Roads Administration at a cost of about $10 million but expense of keeping the road open in the face of slides and snow conditions made its continued use impracticable, officials said.



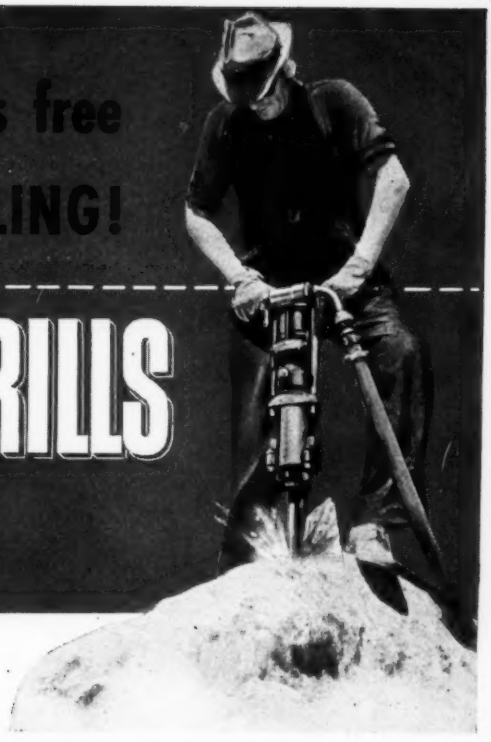
Official U.S. Navy Photograph
La Crosse 50 Ton Semi

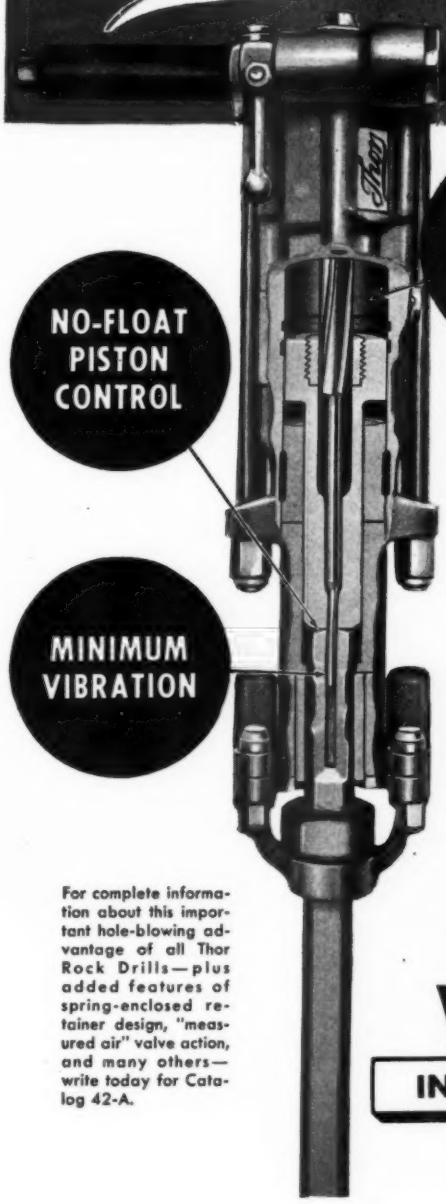
Buy Bonds Regularly

La Crosse Trailer & Equipment Company
LA CROSSE, WISCONSIN

They BLOW all cuttings free for FASTER, SURER DRILLING!

Thor ROCK DRILLS





Full-Pressure Air Blast Straight Through the Tool Assures Positive Hole-Cleaning

There's no accumulation of cuttings at the drilling point to cut down speed or stall the drill by jamming the steel when Thor Rock Drills let go with their *full-line* blast of air to keep the hole clean . . . to keep the drilling rate fast and steady!

Powerful hole-blowing is an important advantage of all Thor Rock Drills which not only steps up drilling speed for more footage per shift, but also slashes maintenance costs by extending the life of both the tools and the drill steels through minimum vibration.

HERE'S WHY CUTTINGS WILL NOT STALL THOR ROCK DRILLS!

Full-Line Pressure—Exclusive Thor design places exhaust ports to remove all air from *below* the piston when the operator blows the hole. Full-line air pressure is concentrated behind the piston to force it down tight against the steel—directing full air power straight through the machine and into the hole.

No-Float Piston Control—Forcing the piston tight against the steel prevents floating and fluttering inside the cylinder during the blowing operation. No air is wasted. Hole-blowing is extra-efficient and powerful.

Minimum Vibration—The air tube inside the piston and hammer is *held rigid* by tight joining of the piston and steel to assure longer service life by reduction of vibration.

For complete information about this important hole-blowing advantage of all Thor Rock Drills—plus added features of spring-enclosed retainer design, "measured air" valve action, and many others—write today for Catalog 42-A.

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO 6, ILL.

Branches in Principal Cities

NOT in the *Contract*

Mrs. Brown: Oh, doctor, it was nice of you to come way out here just to see me.

Doctor: Well, I have a patient next door, so I thought I'd just kill two birds with one stone!

Old Lady (on platform): "Which platform for the London train?"

Porter: "Turn to the left and you'll be right."

Old Lady: "Don't be impertinent young man."

Porter: "All right, then, turn to your right and you'll be left."

Lady: "How do you say goodnight in Spanish?"

Gent: "Buenos noches!"

Lady: "Well, it's about time. I thought you'd never go!"

"Will you have the imported or domestic sardines on your sandwich?" asked the waitress of Sandy McStash.

"Whut's the differrrrence?" asked Sandy.

"The domestic is a quarter, the imported thirty-five cents."

"I'll take the domestic. I'm payin' no sardine's passage across the ocean, my good woman," roared McStash.

He: May I take you home?

She: Sure. Where do you live?

Minister: "Really, my dear, you should wait for more than two months after your husband's death before marrying again."

Widow: "Yes, but you forgot, Reverend, that he was paralyzed for eight months."

"This football stuff of makin' us go into a huddle for instructions is gonna' get us into a hell of a mess someday!"

Jones—Look at the bunch of cows!

Smith—Not bunch, herd!

Jones—Heard what?

Smith—Herd of cows!

Jones—Sure I've heard of cows.

Smith—I mean a cowherd!

Jones—What do I care if a cow heard? I didn't say anything I shouldn't have!

Dentist: "Your teeth are in bad shape; you should have a bridge put in at once. It will cost only $75."

Patient: "Couldn't you just put in a culvert now?"

A busy and harassed company clerk in the Q.M.C. looked up the other day from his high piled desk to observe one of the Chaplains smiling benignly at him. Politely he smiled back. "My son," the Chaplain said, "are you keeping up with the Ten Commandments?"

"Sir," replied the clerk, "I'm having a helluva time just keeping up with company correspondence!"

"Do you know what good clean fun is?"

"No, what good is it?"

An Irishman carrying a large sack of potatoes along a lonely road was overtaken by a man driving a team hitched to a wagon. The driver offered Pat a lift, which he gladly accepted, but still kept the sack of potatoes on his back. The driver told him to put them down in the wagon.

"Sure," replied Pat, "I'm thankful for the lift ye gave me, but I don't want ye to be burdened with the taters, too."

As they left the night club, the cute blonde asked her escort, "Say, what's the idea giving that hatcheck girl five dollars for checking your coat?" And the escort whispered, "Shh, not so loud. I didn't wear a coat tonight."

"I've a suggestion, honey. Let's pretend we're married."

"Why, you blankety-blank-blank-blank so-and-so you!"

"Hold on! I didn't mean to insult you."

"You didn't insult me. I'm pretending we're married."

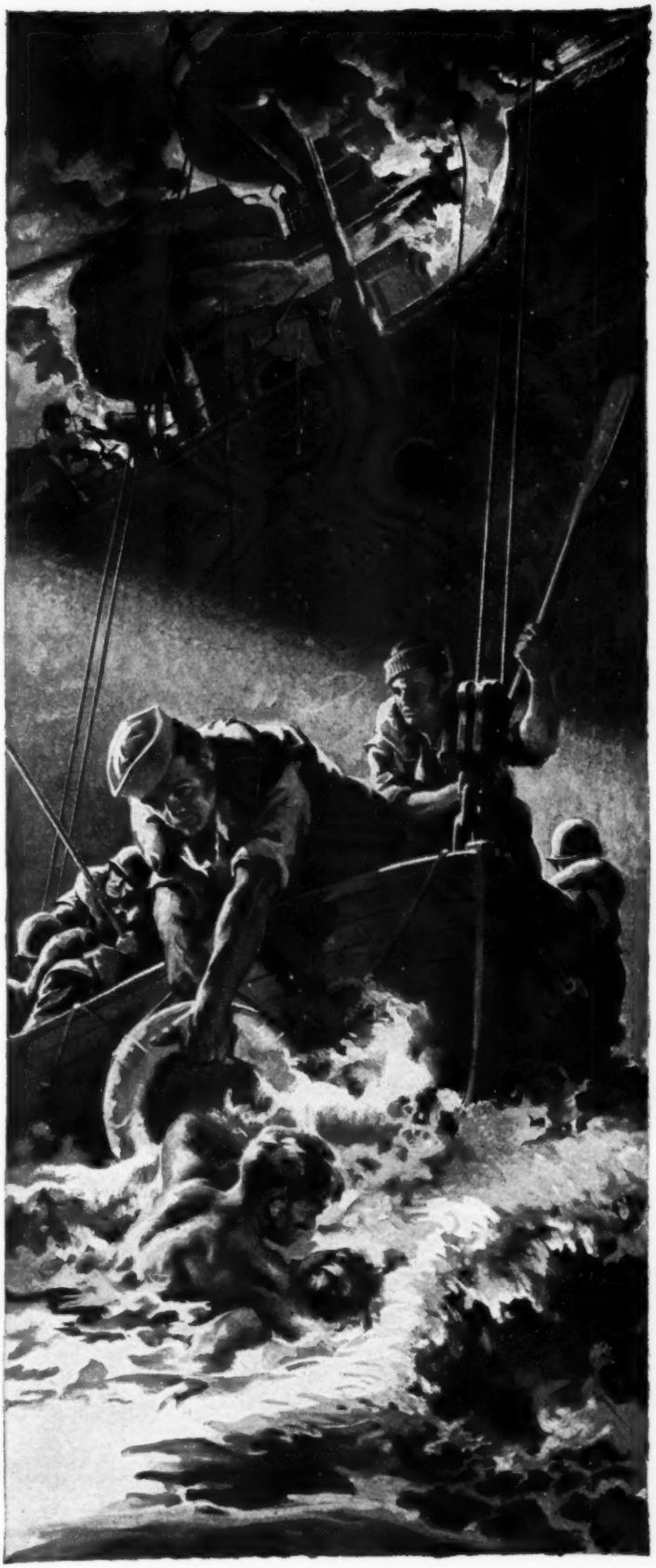
Judge: "I'm sorry, but we can't issue a license to your grandchild, she's only 15 and too young."

Old Negro Granny: "Lawdy, mister jedge, wat we gwinna do? She's ol' 'nuf to do what she's done did."

BACK OF EVERY ATTACK...

Preformed wire rope

SPEEDS VITAL OPERATIONS



It's hell on high water. Enemy dive bombers drop deadly loads. A direct hit! Exploding shells rip the ship wide open. It trembles and shudders.

General alarm sounds. Then the command, *"Abandon ship!"* All hands race for the lifeboats — their only means of escape from the flaming, sinking wreckage.

Men huddled in these boats are lowered to safety by Preformed wire rope. It handles easily and smoothly. No delay from tangled, twisted rope when delay would cost lives.

That's why for lifeboats it's Preformed. At sea, on land, in the skies, it's the tough wire rope for the tough war jobs.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR SUPPLIER FOR PREFORMED WIRE ROPE

• Proving that youth is no barrier to service in the Chinese Army is seven year old Pvt. Kee Ho King and some of his fellow soldiers, moving up with supplies in the offensive to lift the Jap blockade of the Burma Road.

China's Back Door

(Continued from page 580)

Americans began to realize the magnificent job done by Chinese hand labor, superb stonework in bridges and arches, and the amount of work that can be accomplished by the Chinese coolies using the ancient "tzan tzu" or mattock-like shovel plus flat bamboo baskets.

The inspection laid the basis for numerous repairs necessary for two-way traffic movement. YBHEA made up an estimate. Later, when Kung was made director there was a re-estimating involving standard work to be done, necessary funds, and how inflation might affect the task.

The Ministry of Communications allocated $100,000,000 in Chinese funds to start the work in July, 1943. It was about half the amount requested. Inflation in the price of rice immediately began to cut into this to one-sixth. Rice was selling for $1.90 per catty in Paoshan at the time of the estimate. By the time work began it rose to $5.70 and today it is about $82 per catty. Such a change in prices cut the amount of work possible. Both Chinese and American engineers agreed the most important work was on bridge repair, reconstruction of culverts and widening the highway at its most narrow spots. Up to this time the road was merely a one track road and not a highway in the American sense. In some places it was only 10 feet wide. Speed in construction was important to keep ahead of inflation.

Work got under way in September, 1943, and by January, 1944, the job on the chosen sections was completed. This was the proof that the Chinese could do a good job with the will, plans and supervision.

At the beginning of 1944 only 701 kilometers (about 435.5 miles) were in the hands of the Chinese and available for working. Of this amount 357 kilometers, or about half, have been widened, although not all to the agreed standard of 30 feet. Rock cuts in the mountains were widened to 20 feet and dirt cuts were widened and filled to full 30 feet. More than a thousand culverts were repaired. The job was on the way.

In December, 1943, another estimate was made but funds for the next project were not appropriated until June, 1944. But in the first half of 1944 repairs to 136 stone arch bridges and 248 short-span bridges were completed.

Equipment

The first inspection showed that there was some road-building equipment lying about the road, uncared for and unused. Some was American make, some British and some German. The Chinese, untrained in the use of machines, and not wanting to use up the small amount of Diesel oil available, turned to hand labor. Finally, the old equipment was pooled under YBHEA and the United States Army agreed to bring in operators. The Chinese watched with interest this work which began late in 1943. The construction force was organized October 1, 1943.

Equipment which had been abandoned to the winds, monsoons, mud and changing seasons, with valves open and uncovered, was almost in the state of junk. Parts were only available in some cases in India. But the Chinese set up a machine shop, made parts, and some of the machinery got into operation that was good for about 20 per cent of the time.

Demonstration was made by the American crews on a middle section which was considered most difficult. Rock and shale were the base and sheer walls and precipitous drops were everywhere. Most parts of the road in this section were 12 or 15 feet wide. The machine crews, however, set out to show what could be done with proper use of the equipment. Eight months later, despite hundreds of accidents, breakdowns and all manner of discouragements, 10 kilometers of high grade road were completed. Equipment used included three D-4 tractors with bulldozers, only one of which was in working order at any given time; one Caterpillar 112 road patrol, usable one-fourth of the time, one large Ingersoll-Rand air compressor and one German air compressor, only in use about one-sixth of the time. The Chinese were so interested that they kept accurate records of the exact hours each piece of equipment was in operation and the amount of work done.

In January, 1944, it was discovered that a considerable amount of parts and supplies for road equipment was in India as a portion of Chinese Defense Supplies. A trip to Chungking obtained release and a junior officer was sent to India to locate the supplies stored at an airfield, inspect them and ship back needed parts. It was First Lieut. Richard J. Griffith of Racine, Wis., who carefully went over all the parts, eliminated those too rusted to be used and shipped the usable pieces back to China. Those parts were the factor which really put the road equipment into operation.

During this trial period there were only about 30 American soldiers and 200 Chinese coolies working on the road and they were accomplishing with machinery almost as much as 30,000 coolies with hand labor.

The results astounded and delighted the Chinese engineers. Every

• American officers check pack saddles before ferrying across the Salween River as they accompany Chinese armies to the front in the campaign against Japs in China. These members of the American Y-Force Operations Staff act only in an advisory capacity to the Chinese.

Chinese supervisor and district engineer sent in requests for use of equipment on their sections. They even began to ask for equipment by name.

Training

During this period American officers set out to acquaint individual Chinese soldiers and engineers with the use of the machines. One of the complications was to adjust machines to fit Chinese. The average Chinese worker was about five feet tall as compared to five feet ten inches height of American bulldozer operators. The training got on a friendly basis and the spirit of the Chinese-American co-operation began to strengthen. Chinese began to ask for more and more machinery to be flown over the Himalayas.

Rock excavation along the Burma Road, and there is plenty of it, took a toll of Chinese lives by the ancient and careless methods. Black powder was used for blasting. Chinese did not used detonators, but instead made fuses of paper, soaked in oil and black powder, and of uncertain timing. Powder was jammed into the drill holes with the back end of the steel hand drill. There were many explosions that meant sudden death for countless coolies.

Compressed air operated tools were difficult for the Chinese to use. Low pay, small rations, short stature and light bodies made it difficult for the Chinese to use air hammers, shovels and drills. But the Chinese government cooperated by giving the men who operate that equipment higher pay than even the director. Air tool men became the aristocrats of the laborers, ate well, built up stamina and doggedly clung to their jobs. As months passed they became the best and most reliable workmen on the job.

Through all the work the American military forces have been advisory to the Chinese but so many times they have proved their points, their good intentions, and their methods that their advice is freely accepted.

The Burma Road Engineers, although just a small force, has the task of keeping the route open so that supply convoys and troops may make their way close up to the battle-front where Chinese soldiers are daily in deadly conflict with Japanese. There are still a few strong points to be reduced and a large area from which the invaders must be driven.

To many observers the entire Burma Road operation has been an outstanding example of cooperation between American mechanical and technical talent and Chinese engineering skill and labor power.

The New Frontier

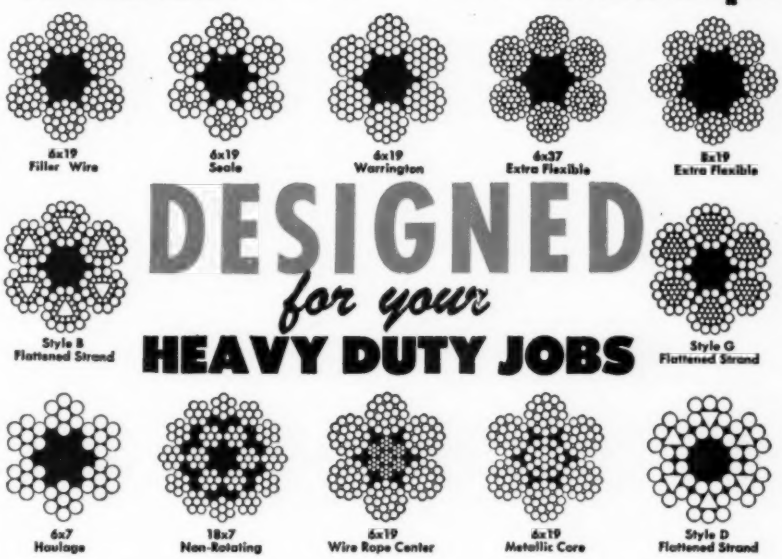
(Continued from page 573)

cultivation; the first being removal of the stumps from the ground, and the second the disposal of these stumps.

Mr. Graham has "licked" the job of removing stumps by using a Caterpillar D-7 with a LaPlant-Choate bulldozer and a Caterpillar D-7 equipped with a stumpdozer. This equipment is getting the stumps up very efficiently. The stumps are then "snaked" by teams and small tractors to the dragline which, when equipped with a pair of grab hooks in lieu of the bucket, swing the stumps, logs, etc., into piles 40 to 60 feet in diameter and 20 to 30 feet high. By placing the stumps in these large piles, it is quite simple to burn them satisfactorily. Approximately 1,000 acres of land have been cleared, and this area was ready for the planting of small grain in the fall of 1944. Mr. Graham states that he expects to have the entire field of 2,200 acres cleared, drained and in cultivation by the fall of 1945.

In assisting Milbank with this drainage and land use development

"HERCULES" (Red-Strand) Wire Rope



"HERCULES" is our trade name for the very best heavy duty wire rope that we are able to produce. Best in quality . . . best in design . . . best in fabrication. So that it can be recognized by sight, it is always made with one Red Strand.

As "heavy-duty" service covers a wide range of working conditions, this wire rope is manufactured in numerous constructions, as illustrated above. Most of these constructions can be furnished in either a hamp center, a wire rope center or a metallic core.

Preformed: "HERCULES" Red-Strand Wire Rope is furnished either Preformed or Non-Preformed. Under any conditions, the Preformed is easier and quicker to install and safer to handle. For most purposes it is decidedly longer lasting.

In "HERCULES" there is a *Right* rope for every heavy-duty purpose. You will make no mistake if you let the Red-Strand be your Wire Rope Guide. Its use will help you save time . . . reduce operating cost . . . increase safety.

Maximum wire rope efficiency is obtained only when the rope used is of the construction, grade and type best suited to the particular conditions under which it is to work. Ability to make proper selection comes with experience. We shall be glad to have you consult with us on any wire rope problem you may have.

MADE ONLY BY
A. LESCHEN & SONS ROPE CO.
WIRE ROPE MAKERS — ESTABLISHED 1857
5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • • • 90 West Street
CHICAGO • • 810 W. Washington Blvd.
DENVER • • • 1534 Wazee Street
SAN FRANCISCO • • 320 Fourth Street
PORTLAND • • 914 N. W. 14th Avenue
SEATTLE • • 3410 First Avenue South

the Jasper Soil Conservation District is furnishing technical services only. All of the costs of drainage and of clearing land and putting it into cultivation are being paid by Milbank, which within itself is proof that Milbank looks upon this development as a sound business enterprise. The completion of this drainage and land development will not only pay dividends to Milbank's farming enterprise but will also serve as a modern demonstration and point the way for others to put into effect proper and profitable land use practices.

The development of this area would not have been an economic possibility 20 years ago, and this job is made feasible today by the use of improved types of equipment which are now available for both excavation and land clearing.

If good judgment and the use of improved modern equipment are combined, the vast area, of undeveloped potentially good agricultural land, found along the Atlantic Seaboard will some day support its share of the nation's population and contribute adequately to our national income.

Montana Copper . . .

(Continued from page 577)

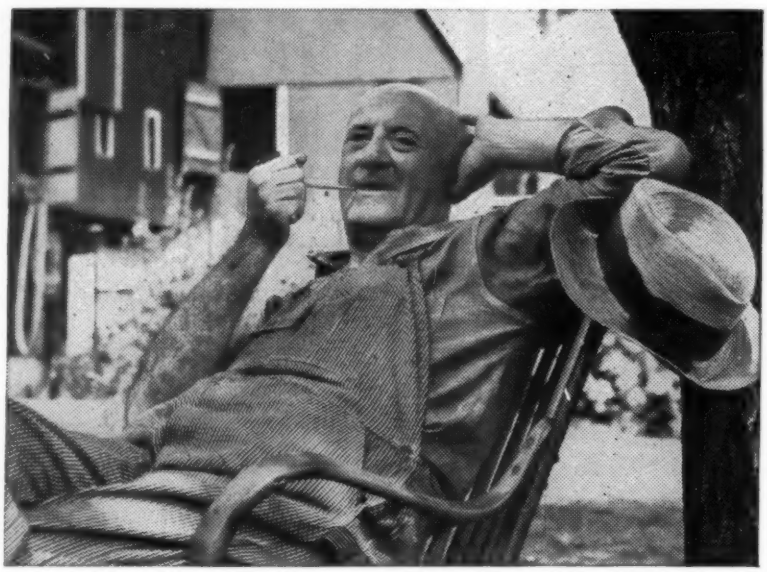
then helps the greaser go over the truck. A Graco high pressure portable gasoline-powered lubricating outfit, installed on a flatbed truck, handles three kinds of greases. One mechanic is in the shop during each of two eight-hour shifts per day to handle maintenance of the trucks. Tires are checked at the beginning of each shift for uniformity of pressure, and drivers also give them all the once-over at the end of each run to the smelter.

Manganese Ore

Another big hauling job done by the C. & F. for Anaconda is the trucking of 1200 tons of heavy manganese ore per 16-hour two-shift day from the Emma mine at Butte to load on cars four-tenths of a mile away. Other trucks haul a sandy overburden from sand pits to the mine for use in back-filling mined-out veins.

Manganese ore is loaded to the trucks by chute from bins at the head of the mine elevator. Four GMC 40,000 lb.-gross contractor trucks, mounted with Wood 8-cu. yd. body and hoist and equipped with Brownlite auxiliary transmission, are used on this ore-hauling job.

At times, when the smelter is shut down for repairs, the ore is hauled one and one-tenth miles to a dump alongside a railway spur track for later loading to cars. When exposed to weathering action, this pink-colored ore oxidizes to a black-colored material, difficult to process at the



Perhaps I'm one war older than you are!

Believe me, after the last war I saw what happened. Will you let me give you some advice?

•

If you've got a job today—for your own sake, fellow, be smart! Think twice before you fight for a wage increase that might force prices up and land you behind the eight-ball in the end.

Salt away as much as you can out of your present wages. Put money in the bank, pay up your debts, buy more life insurance. Above all, put every extra penny you can lay your hands on into Uncle Sam's War Bonds and *hold* 'em!

Nobody knows what's coming when the Germans and the Japs are licked. Perhaps we'll have good times. Okay. You'll be sitting pretty. Perhaps we'll have bad times. Then they're sure to hit hardest on the guy with nothing saved.

The best thing you can do for your country right now is not to buy a thing you can get along without. That helps keep prices down, heads off inflation, helps to insure good times after the war.

And the best thing you can do for your own sake, brother, if there *should* be a depression ahead, is to get your finances organized on a sound basis of paid-up debts—and have a little money laid by to see you through!

4 THINGS TO DO to keep prices down and help avoid another depression

1. Buy only what you really need.
2. When you buy, pay no more than ceiling price. Pay your ration points in full.
3. Keep your *own* prices down. Don't take advantage of war conditions to ask for more—for your labor, your services, or the goods you sell.
4. *Save.* Buy and hold all the War Bonds you can afford—to help pay for the war and insure your future. Keep up your insurance.

HELP US KEEP PRICES DOWN

A United States war message prepared by the War Advertising Council; approved by the Office of War Information; and contributed by this magazine in cooperation with the Magazine Publishers of America.

It's easier to lift, lower, push or pull the Simplex Way!

Simplex LEVER · SCREW · HYDRAULIC **Jacks**

for every construction purpose

Awarded the Gold Medal for Safety

Ask for Catalog 44

Templeton, Kenly & Co., Chicago 44, Ill.

Official U. S. Marine Corps Photo

Keep Your Plant's Quota "OUT FRONT!"

Victory depends upon materials—as well as men! To keep our American forces "closing in" overseas, you and every other manufacturer here at home must *keep on making* "Out Front" War Bond Quotas!

This means *action now* on *every* point in the fighting 8-Point Plan to step up Payroll Deductions. For instance, have you a 6th War Loan Bond Committee, representing labor, management and other important groups in your company? Selected Team Captains yet—preferably returned veterans? If so, have you instructed them in sales procedure—and given each the Treasury Booklet, *Getting the Order?*

How about War Bond quotas? Each department—and individual—should have one! Assigning responsibilities is vital, too! Have you appointed enough "self-starters" to arrange rallies, competitive progress boards and meeting schedules? Are personal pledge, order or authorization cards printed, and made out in the name of each worker? Planning for resolicitation near the end of the drive? Your State Payroll Chairman is ready now with a detailed Resolicitation Plan. And, have you contracted for space in *all* your regular advertising media to tell the War Bond story?

Your positive *Yes* to *all* points in this forward-to-victory 8-Point Plan assures your plant meeting an "Out Front" Quota in the 6th War Loan—and speeds the day of unconditional surrender!

6th WAR LOAN

The Treasury Department acknowledges with appreciation the publication of this message by

Excavating Engineer

This is an official U. S. Treasury advertisement—prepared under the auspices of Treasury Department and War Advertising Council.

smelter. Therefore, stockpiling at the dump is arranged to assure that first-delivered ore will be the first-shipped when the smelter is ready to receive it. Loading for shipment is by a ¾-cu. yd. Link-Belt Speeder shovel.

Sand and sandy overburden are hauled by another fleet of four GMC contractor trucks three and one-half miles from pit to mine. The sand, used in mine concreting, is loaded and screened at the pit by a Barber-Greene loader equipped with a vibrating screen attachment. Screened to pass a No. 4 minus size, 35-cubic yards per hour are produced.

The importance of this C. & F. contract with Anaconda Copper Mining Company as a vital war operation is attested by a recent acquisition by C. & F. of five new truck-trailer units for the job under special allocation by the War Production Board. The GMC trucks were purchased from the Butte Truck & Parts Company and the Fruehauf semi-trailers from Fruehauf Trailer Company in Billings.

Contractor's Personnel

L. M. Sheridan is manager for C. & F. Trucking and Contracting Co.

• Manganese, which is also mined at Butte, is being loaded from bins at the head of the mine elevator into GMC contractor truck equipped with a Gar Wood 8-yd. body.
P & E Photo

Assisting him are Louis Mohr, general superintendent (who handles the slime job); Halcy Young, superintendent (New Works Tailing Pond job); Ed Frey, foreman (High Ore Waste Dump job); Jas. O'Neill, master mechanic, and Harold Bray, yard foreman (who also is responsible for the manganese ore handling operation). In the office, Rex Fuller is office manager and Roscoe Nickerson, timekeeper.

THESE LINN HALFTRAKS

Two of a fleet, haul 8 tons of asbestos rock over rough terrain and 3,000 feet of 25 percent grade.

THE LINN MANUFACTURING CORPORATION, MORRIS, N. Y.

TOMORROW
May Be
TOO LATE

Save a Life

Make an Appointment Now with Your Local

RED CROSS
BLOOD DONOR SERVICE

A Time-Saving ACCESSORY

Bulldog ROPE SOCKETS never fail. The harder the pull . . . the tighter the grip! Attachment is easy and quick and directly in line with pull, eliminating costly kinks. Made in dozen sizes and four different styles.

T34C

BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

HAYWARD BUCKETS

USE RIGHT BUCKET FOR THE JOB

Hayward makes all four — clam shell, drag-line, electric motor, orange peel. A Hayward recommendation is unprejudiced.

THE HAYWARD COMPANY
52-54 Church Street
New York, N. Y.

TAMPTITE

SAVES TIME

SAVES LABOR

PACKS SNUGLY

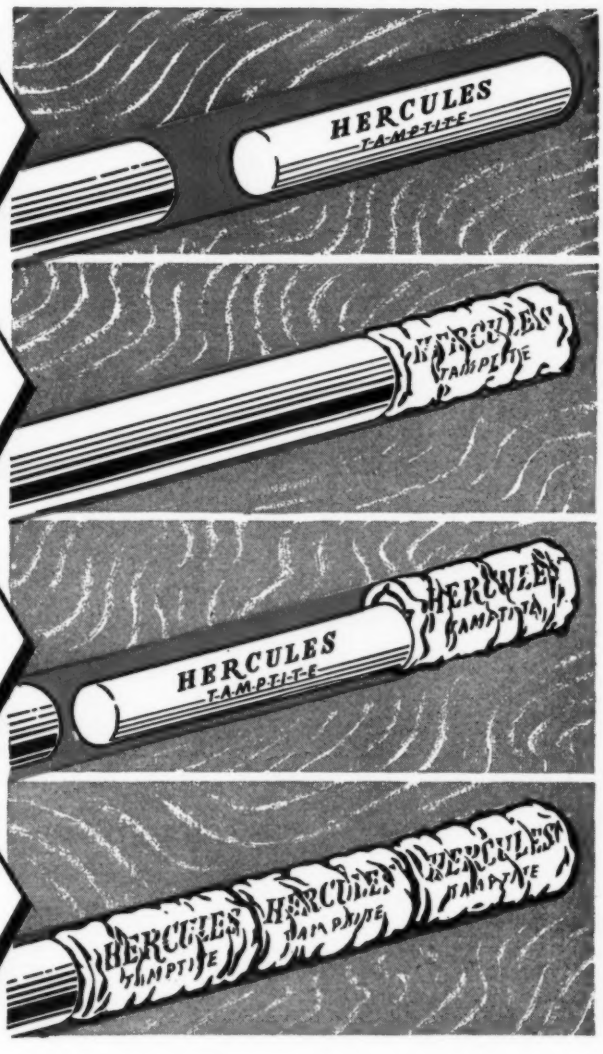
GIVES BETTER BREAKAGE

1 With Tamptite, you load your favorite Hercules explosive into the bore hole in the usual manner. There's no need to split the cartridge. That saves time and eliminates loose, spilled powder.

2 Next, the tamping rod compresses the dynamite in the hole, packs the charge tightly. There is practically no air space remaining around the charge.

3 Insert another Tamptite cartridge. Then, simply tamp the same as the first cartridge. Continue inserting and tamping cartridges for whatever loading you wish.

4 Your charge is concentrated snugly for maximum blasting effectiveness. The result is better breakage of ore or rock, speedier mucking, and a faster mining cycle.



Order your favorite Hercules explosives in Tamptite cartridges. All the customary grades and sizes of Hercules Gelamites*, Hercomites*, Extra Gelatins, Gelatins, and Extra Dynamites are available in this time-saving wrapper.

HERCULES

EXPLOSIVES

*REG. U. S. PAT. OFF. XR-4

HERCULES POWDER COMPANY INCORPORATED .... 972 KING STREET • WILMINGTON 99, DELAWARE

ORDER HERCULES EXPLOSIVES IN TAMPTITE CARTRIDGES

William M. Bager

William Mattsson Bager, 65, Technical Director in charge of special development work for Bucyrus-Erie Company, South Milwaukee, Wis., died at his residence in Pass Christian, Miss., on September 28th.

Mr. Bager was born in Copenhagen, Denmark, and following his graduation as a mechanical engineer from the Royal Institute of Technology in Stockholm, Sweden, in 1900, he came to the United States and started work as a draftsman for Bucyrus-Erie Company. After a short time he resigned from Bucyrus-Erie and with some friends organized a small company for designing and manufacturing vacuum and compressed air cleaning devices, then in their infancy. He disposed of his holdings in this company in 1905 and reentered the employ of Bucyrus-Erie with which company he has been connected until the time of his death, successively as draftsman, chief draftsman, mechanical engineer, chief engineer, vice-president in charge of engineering, and vice-president in charge of sales and engineering. After serving as vice-president from 1929 to 1943, Mr. Bager gave up the duties of that office because of poor health and became Technical Director.

Mr. Bager's philosophy in regard to his work is vividly portrayed by a paraphrasing from Kipling's "Mary Gloster" which he had framed and hung in his office.

"And they asked us how we did it,
and we gave 'em the Scripture Text,
'You keep your light so shining a
little in front o' the next!'
They copied all they could follow,
but they couldn't copy our mind,
And we left 'em sweating and stealing
a year and a half behind."

Mr. Bager was the inventor of approximately 40 patented excavating machinery innovations. His contributions to the excavating field were of such major importance that he was universally recognized as one of the leading engineers of the industry. He is listed in "Who's Who" and was a director of Bucyrus-Erie Company, Bucyrus-Monighan Company and Oilgear Company.

He was a member of Army Ordnance Association and American Society of Military Engineers, and a former member of the American Society of Mechanical Engineers and the Engineers Society of Milwaukee. He was a Mason and a member of the University Club of Milwaukee.

In the course of this long service to the excavating industry, he made an unusually large number of friends, by whom his loss will be keenly felt.

Mr. Bager married Elsie S. Dieth of New Orleans, La., in 1910. They lived in Fox Point, a suburb of Milwaukee, Wis., until they made their residence in Pass Christian a few years ago. His hobbies were landscape gardening, fishing and travel.

In addition to his widow, Mr. Bager is survived by a brother, Frederic Bager of South Milwaukee, Wis., who is associated with the T. L. Smith Co. of Milwaukee.

WILLIAM MATTSSON BAGER

William A. Anderson

William A. Anderson, 75, president of John A. Roebling's Sons Company, Inc., since 1936, died September 10th at his home in Princeton, N. J. He had served the Roebling organization, manufacturers of wire and wire products, of Trenton and Roebling, N. J., for 56 years.

Mark L. Reed, Jr.

Mark L. Reed, Jr., president and treasurer of Reed and Abee, Inc., contractors of Asheville, North Carolina, died September 6 of injuries suffered in an airplane crash at Asheville on September 2.

Mr. Reed, who was 42 at the time of his death, was prominent in business and aviation circles of Asheville. He was lessee and manager of the Asheville-Hendersonville airport, vice-president of the White Transportation Company and a large stockholder in the First National Bank and Trust Company of Asheville and in the Grove Stone and Sand Company.

Mr. Reed is survived by his widow; a son, Mark, III; two sisters, Mrs. Jessie Reed Burnett and Mrs. Ella Reed Matthews, and a brother, Joe L. Reed, all of Asheville.

LARGER HOLES—

Better fragmentation with a big decrease in preparation costs per ton of rock — that's a big reason why many mine and quarry operators are swinging to the large 9-inch to 12-inch blast holes drilled with the Bucyrus-Erie 42-T. Easier to drill, easier to load, and having much greater powder capacity, the larger, wider spaced holes mean less drilling per ton of rock prepared — and more rock per move and set-up.

It takes a big, powerful drill like the 42-T to put down the large diameter holes. With its 46-foot derrick, its rigid construction, high speed drilling action and fast, sharp upstroke, the 42-T swings up to 6000 pounds of tools . . . and puts down large diameter holes as rapidly as other machines drill 6-to 8-inch holes.

It's easy to take advantage of the increased tonnage and decreased drilling costs that come with larger holes. Write for details on the blast hole drilling economy that will be yours with the 42-T

H-51C

BUCYRUS-ERIE

SO. MILWAUKEE WISCONSIN

Field NOTES

Easing Shovel Hand Grip

The long straight-handled ditch or trench shovel becomes very tiresome after a short time for the right hand to grip on the extreme end, more so when heavy gloves are worn. Material handled with this kind of shovel is thrown some distance and an extra holding grip of the hand is necessary as the shovel is turned over and given a jerk at the end of the throw. This turning and jerking falls on the back of the hand or last three fingers.

If a large common rubber-headed tack is driven into the front of the shovel handle three or four inches from the end (as indicated by arrow in illustration) the first finger, or first two fingers can nicely hold against it as the shovel is jerked back to loosen and toss off the load on the shovel blade. In this manner, the strongest part of the hand can easily take its share of the grip right when it is needed.

The tack is never in the way in other movements of the hand when guiding the blade into the material to be moved. With the tack in the handle the shovel can be used continuously with but little or no tiresome results to the wrist and fingers gripping the handle end.

• Rubber-headed tack eases hand grip on long handled shovel.

—By Frank Bentley

Utility Air Compressor

Once in a while there is an emergency need for compressed air when no air compressor is available.

Any ordinary water tank can be utilized. It will serve the purpose of an emergency air compressor nicely, provided it does not have a leak.

The method of operation is as follows: Close the "air valve at the top of the tank and allow water to enter at the bottom. When the trapped air in the tank attains the same pressure as the water in the supply main, the inflow of water will cease. The compressed air in the top of the tank can then be used for such purposes as paint spraying, filling tires, blowing scale out of radiators, starting diesel engines, etc.

When the tank fills with water, it can be drained and the process repeated.

—By W. F. Schaphorst

Use for Quack Grass

There have been at least two practical uses found for quack grass, long considered an obnoxious weed. In the Northwest it has been assigned to the task of holding railroad embankments along the Columbia River and it has been used for airfield turf.

Quack grass has been found to thrive in sections extending from North Carolina, Arkansas and New Mexico, north to Newfoundland and Alaska. Quack grass may also have a future for areas where a tenacious turf is required, as for airfields, army camps, athletic fields, banks of streams to prevent erosion and steep uncultivatable hillsides in general.

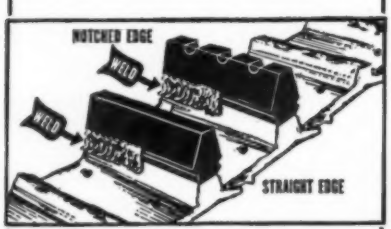
Quack grass has an underground root system like a telephone cable. Every time a root is cut there is a new succession of shoots. It grows thicker and thicker as time goes by. As a ground cover to keep down dust, prevent erosion, and for use in dry soils, it is a natural.

• Colored celluloid milk bottle caps make excellent flashlight signalling attachments.

Flashlight Signalling Attachment

Common inexpensive colored celluloid milk bottle caps can easily be used for red or green caution or safety signalling with a flashlight. The three curved ears of the cap allow it to be firmly and snugly fastened over the lens glass of a flashlight with a stiff rubber band. The caps will not break like glass.

Rebuild your
TRACTOR GROUSERS
WITH BULLDOG
Grip-Lugs



Easily Welded
Other Products
Trak-Link Re-Nu Plates
Mango Bars for Repointing
Digger Teeth
Excelloy Overlay Metal
Send for Folder EE5
ALLIED STEEL PRODUCTS Inc.
N. B. C. Bldg.
CLEVELAND 14, OHIO

ERIE TRUCK MIXER PLANTS

Erie builds a complete line of central concrete plants to keep truck mixers on the move.

Consult Erie now for the most modern of Post-war Plants.

ERIE STEEL CONSTRUCTION CO • ERIE, PA.
AggreMeters • Buckets • Concrete Plants • Traveling Cranes

Notes from the manufacturers

George J. Atwell Foundation Corporation, 45 Rockefeller Plaza, New York 20, N. Y., announces the election of George J. Atwell, Jr., former vice-president, as president.

Brooks Equipment Corporation, 90 West St., New York 6, N. Y., announces the opening on August 1st of its Chicago office under the direction of James K. Grindle of Hammond, Indiana, former sales engineer for the General Electric Company of Chicago.

Caterpillar Tractor Company, Peoria, Ill., reports that W. K. Cox has been advanced to the position of assistant general sales manager. William S. Ziegler, with the company as a field representative since 1929, was made assistant sales manager of the Eastern Sales Division early in 1944, and is now appointed sales manager of that division to succeed Cox. F. D. Haberkorn, the company's representative in Texas and Oklahoma, has been appointed assistant sales manager of the Eastern Division.

Worthington Pump and Machinery Corporation, Harrison, N. J., purchased the Electric Machinery Manufacturing Co., Minneapolis, Minn. Electric Machinery will continue to operate independently of the other Worthington activities. Its present executive personnel will continue in their respective offices.

The Timken Roller Bearing Company of Canton, Ohio, has organized a subsidiary, The Timken Roller Bearing Company of South America. After the war, under the direction of Jules A. Morland, the new firm will handle engineering development of Timken products in the Latin-American countries.

Fairbanks, Morse & Co., Chicago, Ill., has purchased the Pomona Pump Company, a division of Joshua Hendy Iron Works in a $4,000,000 transaction. All physical assets, patents and trade-marks of the Pomona and Westco pump lines were included in the transaction.

No changes in personnel are contemplated and, according to Morse, Arnold G. Brown, general sales manager of the Pomona company, becomes assistant manager of the Fairbanks-Morse Pump Division in charge of Pomona and Westco products. Distribution and sales will continue under Brown's direction.

Hereafter the Pomona pumps will be known as Fairbanks-Morse-Pomona, and Fairbanks-Morse-Westco line.

American Hoist and Derrick Company of St. Paul 1, Minnesota, announces the appointment of Coast Equipment Company, 948 Bryant St., San Francisco 3, Calif., as exclusive representatives in northern California.

Hercules Powder Company, Inc. of Wilmington, Del., announces that Vinsol resin and Truline binder now are available to industry. Vinsol resin has been used for asphalt emulsions, air-entraining Portland and masonry cements, and during WPB allocation for plastics and paperboard to replace strategic metals. Truline is used by foundries as a core and mold binder.

3 STRIKES

on the HAND LOADING PROBLEM

Brooks LOAD LUGGER

for LOADING · HAULING · DUMPING

STRIKE OUT those time losses, manpower and equipment shortages by using Load Luggers on your trucks for material handling jobs.

The truck-mounted Load Lugger with 5 to 10 detachable buckets is a sure time-saver and profit-maker. It's faster, easier, and requires fewer trucks and drivers.

Write for Catalog No. 44 and ask about the TrucKrane Boom Attachment

DISTRIBUTORS IN ALL PRINCIPAL CITIES.

Brooks EQUIPMENT AND MFG. CO.

311 Davenport Road Knoxville 8, Tenn.

New trade literature

Title: **"Blaw-Knox Bucket Catalog"**

Subject: Simplifies the problem of selecting the proper bucket to meet the operating requirements when single drum hoists and hook-on applications are involved. It takes the guess work out of the problem of selecting the proper bucket for a particular job and amply classifies the different types and their uses. Each type of application is classified into the following four groups: how to select; typical method of installation; table of sizes, and the typical illustrations.

Where to Get: Blaw-Knox Division of Blaw-Knox Company, P. O. Box No. 1198, Pittsburgh, Pa. Request Catalog No. 2002. (Free)

Title: **"R. G. LeTourneau, Inc., Annual Report for 1943"**

Subject: Attractive three-color profusely illustrated booklet giving a resume of business for the past year.

Where to Get: R. G. LeTourneau, Inc., Peoria, Ill. (Free)

Title: **"Bottom Dump Euclids on the Move"**

Subject: Two color booklet of illustrations showing Bottom-Dump Euclids at work on various types of earth moving jobs in practically every section of the country.

Where to Get: The Euclid Road Machinery Co., Cleveland 17, Ohio (Free)

Title: **"Procedures for Testing Soils"**

Subject: Recently issued by the American Society for Testing Materials through the intensive work of its Committee D-18 on Soils for Engineering Purposes is this 210-page compilation giving, in addition to all of the A.S.T.M. standard methods, some 38 suggested procedures for investigating soil and soil mixtures.

The book is arranged in five sections with standard tests, if any, covered first under each section, then

followed by the suggested methods. The five parts are as follows: Indicator Tests on Soils; Compaction and Consolidation Tests on Soils; Strength Tests on Soils; Tests for Soil Cements, and Tests for Soil-Bituminous Mixtures.

Where to Get: American Society for Testing Materials, 260 S. Broad St., Philadelphia 2, Pa. ($2.25 per copy —reduced prices on quantity lots.)

Title: **"Economic and Statistical Information on 'A Sound Plan for Postwar Roads — and Jobs'"**

Subject: Statistical information of the basic material used in showing the importance of construction and the necessity for a postwar highway program of sufficient size to provide the needed improvement of the nation's highway system and to furnish the stimulant to our economy necessary to keep unemployment to a minimum and the national income at a high level.

Where to Get: American Road Builders' Association, International Bldg., Washington 4, D. C.

Title: **"Manganese Steel for the Construction Industry"**

Subject: Bulletin No. 1143-C1 lists reasons why manganese steel can be utilized advantageously by the construction industry. Tractor and ditcher parts, pumps, elevator buckets, crusher parts, bulldozer and scarifier parts and numerous other uses are explained. Bulletin No. 1043-CM points out the advantages of manganese steel for use in the cement mill equipment field. Data is given on chains, gears, pinions, grinding mill liners and screens, rollers, sprockets, pulverizer parts, etc.

Where to Get: American Manganese Steel Division of the American Brake Shoe Co., Chicago Heights, Illinois. (Free)

TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

FOR SALE

Used 50-B steam shovel; 80-B steam dragline; Class 14 steam dragline; all Caterpillar mounted and now operating. Box 3052

FOR SALE

1—4 cu. yd. steam skid and roller Monighan dragline 100' boom good condition.
1—3 cu. yd. Monighan diesel electric 3T walker dragline 87' boom good condition.
Location both machines Arkansas. Box 3062

FOR SALE

One Model 41-B Bucyrus steam shovel, shop No. 5030, mounted on standard caterpillar type traction and equipped with 21' boom, 15' handle, 1¼ cu. yd. dipper. Box 3067

Marion Model 37 Electric Shovel for operation on 440 volts, 3 phase, 60 cycle AC; 1¾ yard capacity; located Indiana. Box 3071

Several 50-B steam shovels, 1½ yard dipper, good condition, location Middle West. Box 3072

Welding and Cutting Outfits, Torches, Regulators and Gauges, for heavy, medium and light welding and cutting. Superior Oxy-Acetylene Machine Co., Hamilton, Ohio.

FOR SALE

One eight-inch heavy duty Butler, Tell-Tale Sand and Gravel Pump. Extra shafts, impellers and liners. $500.00 Cash. Box 3064

7—Allis-Chalmers Speed-Ace
TRACTOR WAGONS
7½ yd. cap.
(Write for illustrated bulletin)
IRON & STEEL PRODUCTS, INC.
13474 S. Brainard Ave. Chicago 33, Ill.
"Anything containing IRON or STEEL"

SURPLUS DIPPERS FOR BUCYRUS-ERIE SHOVELS

2—⅜ cu. yd. Skimmer Scoop Dipper—10-B.
2—½ cu. yd. Drag Shovel Dipper—17-B.
3—½ cu. yd. Skimmer Scoop Dipper—17-B.
1—¾ cu. yd. Welded Dipper—21-B.
1—1 cu. yd. Drag Shovel Dipper—29-B.
1—1¼ cu. yd. Cast Front Dipper—GA-3.
1—1¼ cu. yd. Inserted Type Dipper—30-B, 42-B, E-2, 41-B and 43-B.
1—1¼ cu. yd. Drag Shovel Dipper—33-B.
1—1½ cu. yd. Heavy Duty All Cast Dipper—42-B.
1—1½ cu. yd. Snow Loading Dipper—10-B.
1—2 cu. yd. Rock Dipper—75-B.
1—2¼ cu. yd. Inserted Type Dipper—50-B.
1—2¼ cu. yd. Inserted Type—55-B.
1—2¼ cu. yd. Rock Dipper—75-B.
1—2½ cu. yd. All Cast Dipper—55-B.
1—2⅝ cu. yd. Light Duty Shovel Dipper—54-B.
1—3½ cu. yd. Coal Loading Dipper—75-B.
1—4 cu. yd. Type IV Medium Duty Dipper—100-B.

F.O.B. Works
Write for any further information desired.
BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee Wisconsin

FOR SALE OR RENT

1—80-B Bucyrus steam stripping shovel with 2½-yd. bucket, 48-ft. boom, 36-ft. stick—in excellent condition.
2—1-yd. Marion steam shovels. Type No. 7.
2—11x16 Vulcan steam locomotives, 36-in. gauge. Box 3073

FOR SALE
DRAGLINE BUCKETS

1—¾ cu. yd. Type AU Light Weight Dragline Bucket
3—1¼ cu. yd. Type AY Heavy Duty Dragline Buckets

BUCYRUS-ERIE COMPANY
Parts Department
South Milwaukee Wisconsin

FOR SALE

One 40' Dragline Boom. One Pullshovel Boom and 1 yd. Bucket for GA-2 Bucyrus-Erie Shovel. Box 3069

FOR SALE OR LEASE

Brazil Block Coal stripping proposition on Big Four RR near Clay City, Indiana. Three track tipple with shaker screens and miscellaneous small equipment, ready to operate. Half-million tons of coal owned or under lease and additional acreage available. Excellent proposition for operator having idle stripping equipment and desiring to get into immediate production of coal.

Address C. E. Hines, Worthington, Indiana; Roy E. Price, 411 Indiana Trust Building, Indianapolis 4, Indiana.

WANTED

All types shovels, draglines and cranes.
1—D8 Angledozer with down pressure blade.
1—D8 dozer with scraper wagon.
1—D6 or TD-14 with small 8' blade.
1—Erie 10-B shovel.
1—¾-yard backhoe.
We rent or sell.
CONTRACTORS EQUIPMENT COMPANY
1340-42 Lynn St.
Parkersburg, W. Va.

WANTED

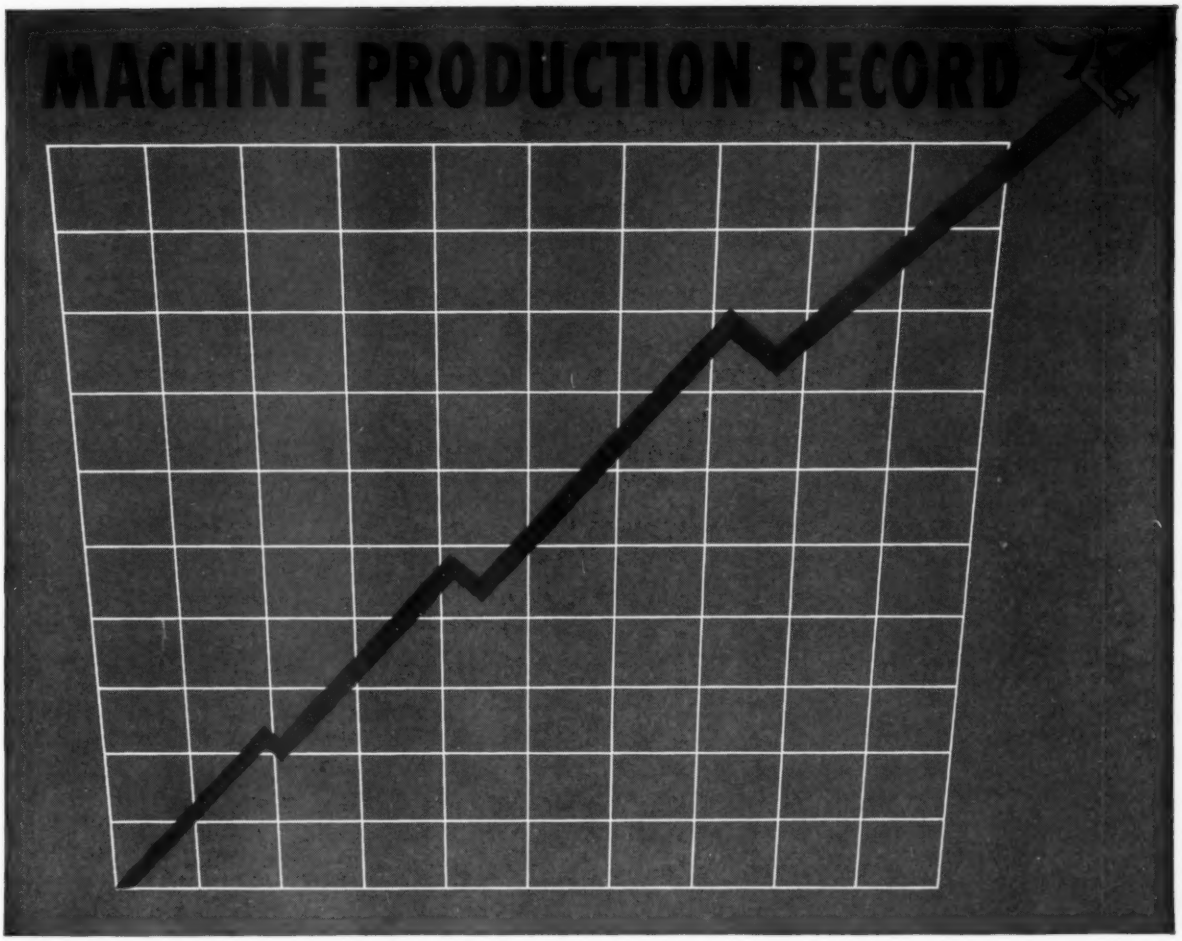
Dragline attachment suitable for Type GA-2 shovel shop No. 3675, must be complete including 40 or 45' boom, forward drum and gearing, fairlead and control mechanism but not including cable.

TOM B. CLEAGE
306 Ewing Avenue
Kansas City, Missouri

POSITIONS WANTED

DRAGLINE OPERATOR

Six years' experience operating dragline, clamshell and crane, gas, diesel and electric. Mostly operating dragline in coal mine. Prefer position on stripping machine. Bucyrus-Erie dragline 5-10 yd. diesel or electric. Can do own repair work. 28 years old, married. Can furnish references. Will go anywhere. Box 9233



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AMERICAN CHAIN & CABLE COMPANY, Inc.

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THE CARRYALL YOU'LL NEED *TOMORROW* CAN BE DESIGNED ESPECIALLY FOR YOU *TODAY!*

TODAY special Fruehauf Carryalls are being used to haul giant fighting tanks to the battle fronts and to retrieve them when damaged by enemy fire or mechanical difficulty.

Tomorrow the heavy-duty Trailers that are having their trial-by-fire now will be all the better suited to the requirements of your job. Many of the features of these war-time Fruehaufs have always been incorporated in our units. Many other features are the direct result of war's demands and military experience.

When you work with Fruehauf on your hauling problem, you find this: it is looked upon by our engineers as an *individual* problem. There is no need or inclination to adjust your requirements to our product—because it is just as easy, and far more satisfactory, to fit our product exactly to your requirements.

The Fruehauf you need may range in capacity from 10 to 100 tons . . . it may be either a semi or full-Trailer type . . . single or double-drop-frame . . . side or rear loading . . . may have four tires or up to twenty-four . . . with any one of a number of wheel and axle combinations . . . any width . . . any length . . . the applications to your special needs are endless.

Today, of course, few Fruehauf Carryalls are being built for civilian use. But today is not too soon to consult with our engineers on getting your *postwar* Carryall designed and through the blueprint stage, ready for the production go-ahead. This costs you nothing extra and entails no obligation—but you will find that it saves you weeks in the long run.

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